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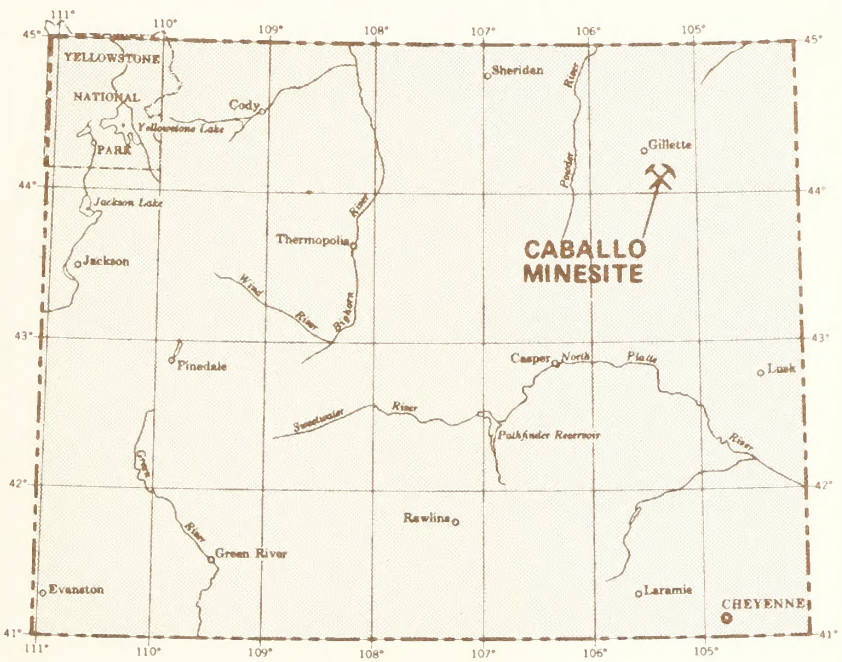
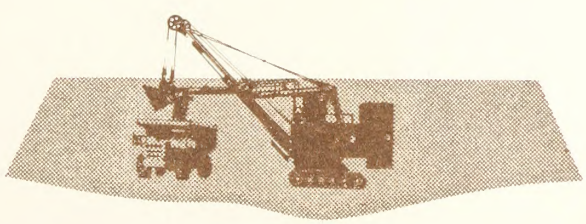
FINAL
ENVIRONMENTAL STATEMENT

PROPOSED MINING AND RECLAMATION PLAN

CABALLO MINE, CAMPBELL COUNTY, WYOMING





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DEPARTMENT OF THE INTERIOR

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March 3, 1849

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Inches (in)	2.54	Centimeters (cm).
Feet (ft)	3.048×10^{1}	Centimeters (cm).
	3.048×10^{-1}	Meters (m).
Miles (mi)	1.609	Kilometers (km).
Square feet (ft^2)	9.290×10^{-2}	Square meters (m^2).
Acres	4.047×10^{-1}	Hectares (ha).
	4.047×10^{-3}	Square kilometers (km^2).
Acre-feet (acre-ft)	1.233×10^{3}	Cubic meters (m^3).
	1.233×10^{-3}	Cubic hectometers (hm^3).
Cubic yards (yd^3)	7.646×10^{-1}	Cubic meters (m^3).
Pounds (lb)	4.536×10^{-1}	Kilograms (kg).
Short tons (tons)	9.072×10^{-1}	Metric tons (t).
Pounds per acre (lb/acre)	1.12	Kilograms per hectare (kg/ha).
Btu/lb	2.326	Kilojoules per kilogram (kJ/kg).
Gallons (gal)	3.785×10^{-3}	Cubic meters (m^3).
Gallons per minute (gal/min)	6.309×10^{-2}	Liters per second (L/s).
Degrees Fahrenheit (°F)	([1])	Degrees Celsius (°C).

[1]Temperature in °C = (temperature in °F - 32)/1.8.

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FINAL
ENVIRONMENTAL STATEMENT

PROPOSED MINING
AND RECLAMATION PLAN

CABALLO MINE,
CAMPBELL COUNTY, WYOMING

ON FEDERAL COAL LEASES
W-3397 AND W-49644

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H. William Menard
Director, U.S. Geological Survey

1979

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Characteristic landscape of the Caballo mine area showing topography, vegetation, pond, and ranch.

SUMMARY

( ) Draft (x) Final environmental statement

Department of the Interior, U.S. Geological Survey

1. Type of action: (x) Administrative ( ) Legislative

2. Description of the action:

Approval of the surface mining and reclamation plan for the Caballo mine, Carter Mining Company, Campbell County, Wyoming. The plan proposes mining of approximately 463 million tons of Federal coal already under lease. Mining is proposed to begin in 1980 at an average rate of 6 million tons per year through 1986 and to continue thereafter at a rate of 12 million tons per year from 1987 through 2018. The plan describes mining operations for 40 years on a total of about 6,700 acres (about 4,300 acres will actually be mined) of Federal, State, and privately owned mineral leases. All of the land surface, except for 640 acres of State land, is privately owned. The coal will be used for electric power generation. If this mine is permitted, coal will go to the States of Nebraska, Kansas, Wyoming, and possibly others.

3. Summary of adverse environmental impacts:

- The land surface will be permanently reshaped and lowered an average of 50 to 60 feet in the 4,300-acre minesite.

- At any one time, about 500 to 2,200 acres will be disturbed, out of productive use, and being reclaimed. During the 40 years of operation, the existing shallow aquifers, vegetation, soils, and wildlife habitat will be destroyed during mining and subsequently reestablished through reclamation.

- The mine-related population increase by 1990 will be about 2,650 people or about 10 percent of the anticipated regional population increase. The city of Gillette will be subjected to increasing short-term economic difficulties as it tries to maintain services.

- Shallow ground-water and surface-water quality and quantity, livestock and wildlife grazing, and open-space qualities will be degraded and restricted in the vicinity of the proposed mine until successful reclamation is completed.

- Fugitive dust will be visible at the mine at times, even though the use of Best Available Control Technology and Best Management Practices will be required.

- The composition of post-reclamation vegetative communities will differ significantly from existing natural communities. On the reclaimed lands, habitats for some wildlife species dependent on native range will be severely reduced.

4. Alternatives considered:

   . No action.

   . Defer Federal action.

   . Prevent development of Federal Coal Leases W-3397 and W-49644.

   . Restrict development on Federal Coal Leases W-3397 and W-49644.

   . Require modification of the mining and reclamation plan.

   . Socioeconomic mitigations.

5. Comments were received from: (See Summary Attachment I.)

6. Date made available to EPA and the public: DES 78-43, October 5, 1978; FES 79- , , 1979.

SUMMARY ATTACHMENT I

Comments on the DES were requested from the following agencies and organizations; asterisk indicates comments received.

Federal agencies:

- Advisory Council on Historic Preservation*
- Department of Agriculture:
  - Soil Conservation Service*
- Department of Energy:
  - Federal Energy Regulatory Commission
- Department of Health, Education, and Welfare*
- Department of Housing and Urban Development
- Department of the Interior:
  - Bureau of Indian Affairs*
  - Bureau of Land Management
  - Bureau of Mines*
  - Bureau of Reclamation*
  - Fish and Wildlife Service*
  - Heritage Conservation and Recreation Service*
  - Office of Surface Mining
- Department of Labor:
  - Mine Safety and Health Administration*
- Department of Transportation
- Environmental Protection Agency*
- Interstate Commerce Commission

State and local agencies:

- Campbell County:
  - Board of County Commissioners
  - School District No. 1
- City of Gillette:
  - City Planner
  - Mayor's Office
- Gillette/Campbell County Department of Planning and Development*
- State of Wyoming:
  - Department of Environmental Quality*
  - Governor's Clearing House
  - Highway Department*
  - Industrial Siting Council
  - State Historic Preservation Officer
- State of Montana:
  - Governor's Clearing House
- State of North Dakota:
  - Governor's Clearing House

Applicant:

- The Carter Mining Company*

Comments were also received from the following:

State and local agencies:

Geological Survey of Wyoming
Montana Department of Fish and Game
Utah State Planning Coordination
Wyoming Department of Agriculture
Wyoming Department of Economic Planning and Development
Wyoming Department of Environmental Quality
  Solid Waste Management
  Water Quality Department
Wyoming Executive Department
  Planning Coordinator's Office
Wyoming Game and Fish Department
Wyoming Recreation Commission
Wyoming State Conservation Commission

Other organizations:

Powder River Basin Resource Council

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CHAPTER I

DESCRIPTION OF THE FEDERAL ACTION UNDER CONSIDERATION

The Secretary of the Interior is considering for approval the mining and reclamation plan submitted in 1977 by the Carter Oil Company and its wholly owned subsidiary and mine operator, the Carter Mining Company, for Federal coal lease W-49644 and for a portion of Federal coal lease W-3397, which are part of the proposed Caballo mine. This chapter discusses that plan and the legal requirements for environmental protection that govern mining and related activities. Chapter III discusses the impacts that would occur if mining takes place, as proposed by Carter Mining Company, within those legal requirements. Chapter VIII discusses alternatives to approving the proposed plan and the impacts of each alternative.

The plan and supporting data are on file in the Office of Surface Mining and Enforcement (OSM), Denver, Colorado, where they can be reviewed by the public. Any proposed changes in the mining and reclamation plan must be submitted to the Office of Surface Mining and Enforcement.[1]

The mining and reclamation plan included in this statement was submitted for review prior to the promulgation of initial regulations (30 CFR 700) required under Sections 502 and 523 of the Surface Mining Control and Reclamation Act (SMCRA) of 1977 (P.L. 95-87) and has not officially been reviewed for compliance therewith. Therefore, the applicant's mining and reclamation plan may not reflect the initial requirements of the regulations. However, in this statement, the applicable initial regulations are considered as required Federal mitigating measures.

The mining and reclamation plan will be returned to the operator together with a request that it be revised in accordance with the initial applicable regulations. As soon as the mining and reclamation plan is revised and returned to OSM, it will be evaluated to determine compliance with the requirements of Federal regulation 30 CFR 700. The mining and reclamation plan will not be approved until it conforms to the requirements of SMCRA and all other applicable Federal and State regulations.

The mineral rights parcels under lease to the applicant for coal mining have been granted by a combination of Federal, State, and private

---

[1]Since the preparation of this document, significant changes have occurred in the roles of the Office of Surface Mining, U.S. Geological Survey, and the Bureau of Land Management regarding Federal coal management. The basic roles are defined in Division of Functions and Responsibilities Concerning Management of Federal Coal Between the Office of Surface Mining, U.S. Geological Survey, and Bureau of Land Management, approved on July 5, 1978, by Under Secretary of the Interior, James A. Joseph. This final EIS has been updated to reflect the responsibilities of OSM, BLM, USGS, and the State regulatory agencies as outlined in the above-mentioned document. Such changes in responsibility do not affect the impacts defined in this EIS.

owners (map 1, in pocket). Terms used in this report to describe the Caballo land are defined below and illustrated in map 1.

- Leasehold - lease, permit, and fee lands held by Carter Oil and Carter Mining Companies (and Peabody Coal Company), plus the surface (owned by Carter Oil Company), but not the coal, of the unleased Federal Coal tracts. Most of the information describing existing conditions is based on surveys that covered the leasehold but not the contiguous easements.

- Caballo mine - 6,700 acres including minesite, plantsite, and all additional acreage to be disturbed under the mining and reclamation plan as presently proposed by the Carter Mining Company. Impacts are evaluated on the basis of the disturbance of this 6,700 acres.

- Minesite - 4,300 acres proposed to be mined.

- Plantsite - 322 acres of facilities.

The mining and reclamation plan described in this EIS is a long-term proposal for a major operation but does not encompass all coal from the Caballo leasehold (map 1). The applicant plans to mine the rest of the coal at a later date, and will submit a mining and reclamation plan for this area at the proper time. The proposed plan being considered at this time for approval covers about 6,700 acres (map 2, in pocket) including all of Federal lease W-49644 and more than half of Federal lease W-3397 (map 1). The land proposed for mining (minesite) also includes 320 acres under preference right lease application (PRLA) W-32063 held by Peabody Coal Company. Carter Mining Company expects to acquire ownership of this 320 acres.

The proposed minesite surrounds a 320-acre tract of unleased Federal coal (map 1). Because the present plan proposes activities that will disturb the surface of the PRLA tract and the unleased Federal coal tract, this EIS considers the potential environmental impacts to both areas. The plan proposes, and this EIS considers, coal mining in the PRLA lands only in the west 320 acres.

With the exception of the 640 acres owned by the State of Wyoming in the northwest corner of the minesite (T. 48 N., R. 71 W., sec. 16), all the land surface included in the proposal is privately owned. Most of this private surface is controlled directly by the applicant.

The State has approved a permit (map 1; Wyoming Permit No. 433, approved June 21, 1976) allowing Carter to mine coal in section 16 described above and to construct processing facilities (map 1) for the proposed operations.

The Carter Oil Company made an easement, encroachment, and sublease agreement with Meadowlark Farms (owner of Amax Belle Ayr South mine land) on December 14, 1976, for a 10-year term, extendible in 10-year increments as long as either party is engaged in coal mining operations in T. 48 N., R. 71 W., Campbell County, Wyoming. This agreement applies to land in sections 9, 17, 20, 26, 27, and 28 on both sides of the proposed Caballo mine west and south lease boundaries (map 1).

The proposed Caballo mine is in the Powder River Basin about 12 miles southeast of Gillette, in Campbell County, Wyoming, approximately 3 miles east of Highway 59, the major north-south road connecting Gillette and Douglas, Wyoming. The Burlington Northern Railroad spur to the Amax Belle Ayr South mine crosses the extreme southeast corner of the proposed mine. Access to the property is by the T7-Hilight Road (fig. I-1).

The mine area is part of a semiarid grass-sagebrush-covered rolling upland (photograph facing page I-1) that is used for cattle grazing with several hundred acres of hay production. No potential prime farmlands (30 CFR, Part 716.7) have been identified on the Caballo leasehold. More than 50 stock watering ponds are on the leasehold along with a few ranch buildings.

A. BACKGROUND

In January 1974 the Departments of the Interior and Agriculture and the Interstate Commerce Commission decided that the National Environmental Policy Act (NEPA) required an environmental impact statement (EIS) before pending proposals could be approved for development of federally owned coal in the eastern Powder River Basin of Wyoming. The EIS discussed anticipated impacts from constructing the 113-mile railroad between Gillette, Wyoming, and Douglas, Wyoming, and developing four proposed coal mines, as well as other anticipated or possible future coal-related developments. Although that EIS did not specifically discuss the proposed Caballo mine, its regional analysis complements the site-specific analysis of this EIS. The regional final environmental statement, "Proposed Development of Coal Resources in the Eastern Powder River Basin of Wyoming," hereafter referred to as FES 74-55, was filed with the Council on Environmental Quality by the Department of the Interior on October 18, 1974. FES 74-55 has been updated; the new regional final environmental impact statement, "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming," hereafter referred to as FES 79-17, was filed with the Council on Environmental Quality by the Department of the Interior on April 3, 1979 (fig. I-1).

The Carter Mining Company proposes to mine approximately 463 million tons of low-sulfur, subbituminous coal from the Caballo reserves during approximately a 40-year period. This includes about 100 million tons of State and fee coal. The coal will be mined by surface methods and transported primarily by unit-trains using the Burlington Northern Railroad, with its existing rail lines, as originating carrier. The Carter Oil

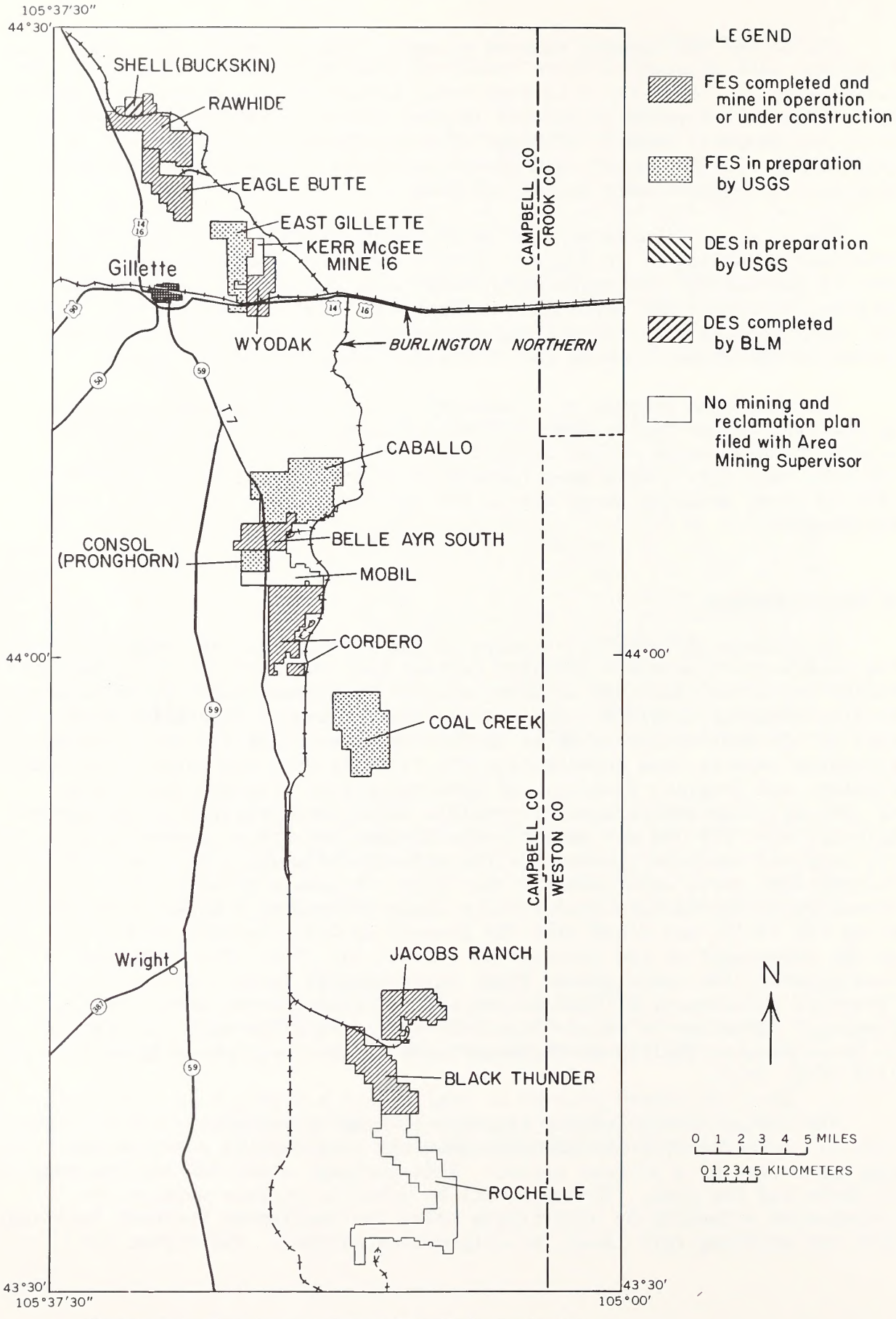

FIGURE I-1.—Map of eastern Powder River Basin showing the location of the present and proposed surface coal mines

Company, parent company for the Carter Mining Company, is presently negotiating with several utilities and industrial companies to supply coal to new facilities. The company has committed approximately 22 percent of the Caballo reserves to the Omaha Public Power District and Western Fuels Association, Inc., a cooperative buying agency for the Kansas City Board of Public Utilities, the Basin Electric Power Cooperative, and other coal consumers. The remainder is committed to other utilities as discussed below.

Carter Oil Company estimates that, within its and the Carter Mining Company's other holdings in the eastern Powder River Basin, there are approximately 400 million tons of coal that can be produced to the year 2000 under current State permits and Federal leases at the Rawhide and Caballo permit areas. All but approximately 10 million tons of this permitted capacity has been committed to electric utilities under existing long-term agreements. This remaining 10 million tons has been offered for shipment to fulfill early requirements of further proposed long-term sales agreements.

B. PROPOSED MINING AND RECLAMATION PLAN

The mining and reclamation activities described in this chapter are based on the mining and reclamation plan prepared in accordance with 30 CFR 211 (May 1976) and additional supporting data and reports submitted by the Carter Mining Company to the U.S. Geological Survey's Area Mining Supervisor and from the company's application to the State of Wyoming for a permit to mine.

1. MINE FACILITIES

The Caballo mine plantsite (map 1) encompasses the mine surface facilities, and is located on about 600 acres of privately owned land held by the Carter Mining Company and included in Wyoming Permit No. 433. Approximately 322 acres will be disturbed in the construction of the plantsite, which includes the coal handling and loading facilities, railroad spur, access roads, warehouse, administration and maintenance buildings, explosive materials storage, fuel storage, electric utilities, and a building to store major equipment spare parts.

a. ROADS

Access and haul roads will be built of compacted overburden surfaced with crushed clinker. The haul roads will be about 80 feet wide and elevated from 1 to 3 feet above ground level. All roads will have culverts where they cross major drainage channels; drainage ditches will be constructed along the sides of the road. Active roads will be continually maintained and water applications will be made to control dust.

b. RAILROAD SPUR

A railroad spur will be constructed to the mine plantsite from the existing Burlington Northern Industrial Railroad spur, which presently runs southeast of the proposed mine. The straight-line distance from the existing line's tie-on point to the load-out facility is about 4,200 feet. The spur will terminate in a loop for loading unit trains. The coal will be transported by 100- to 110-car unit-trains, each hauling 10,000 to 11,000 tons. At the proposed annual production rate of 12 million tons, between 20 and 22 trains per week will be required to transport the coal from the mine.

c. UTILITIES

The utilities for the mine plant will include electric power, industrial and potable water, and sanitary sewage.

1) POWER

Electric power for draglines, coal-loading and overburden shovels, coal-processing and trainloading facilities, and for the administrative, maintenance, and warehouse facilities will be supplied by the Tri-County Electric Association, Inc., via a 69,000-volt primary transmission line. A transformer substation at the mine plantsite will reduce voltage to 4,160 volts for use at the mine plantsite. A distribution line, connected to a skid-mounted stepdown transformer near the working face, will reduce the voltage for use by the electric shovels.

2) WATER

Potable water will be supplied by a well drilled into the Fort Union aquifer at the mine plantsite. Industrial water, which will be used mainly for dust suppression on active haul roads, will come mainly from mine drainage collected in a settling pond, and from a mine dewatering well west of the box cut. Dewatering will progress to 2 or 3 feet below the lowermost coal to be mined. Consumption at full operation is estimated to be 7,000 gallons per day for personal use, 9,000 gallons per day for plant wash water, and up to 15,000 gallons per day for equipment cleaning. At maximum production, peak consumption for dust control will be about 200,000 gallons per day during the summer.

3) SEPTIC TANK

A septic tank system will be installed at the mine plantsite. A sewer line will connect the buildings to the septic tank and drainage field. The system has been initially designed to handle sewage from a work force of 308 people. Additional treatment capacity will be provided as needed.

A separator will be installed in the truck shop to separate oil and grease from wash water before the water is directed to a settling pond.

d. ADMINISTRATION FACILITIES

A steel-frame administration building, including offices, maintenance shops, warehouse, changeroom, and bath facilities, will be sited between the initial box cut and the train-loading silos.

e. CRUSHING, HANDLING, AND STORAGE FACILITIES

A two-roll crusher will reduce mine-run coal to less than 2 inches in diameter or to customer specifications. Foreign material will be rejected, conveyed to a refuse bin, and transported by truck to the mining area for burial.

A covered conveyor belt will carry crushed coal from the crushers to the sampling plant and then on to two sets of two in-line 12,500-ton drive-through silos designed for continuous gravity loading into rail cars. The silos will be used to handle the crushed coal when full production of 12 million tons per year is reached. Sufficient area remains to accommodate more silos, should increased production be needed. Initial coal handling capacity is rated at an average of 3,400 tons per hour, with a maximum capacity of 4,000 tons per hour, or more than 24 million tons per year. Diesel fuel and gasoline will be stored in aboveground tanks. Berms will be constructed to contain any spills that might occur.

2. DRAINAGE PROGRAM

The initially proposed drainage plan (fig. I-2) will divert Tisdale and North Tisdale Creeks, two of three major drainages in the mine, around the plantsite. Segregation of runoff from undisturbed areas will be maintained throughout active mining. Ditches, dikes, berms, and channels will be constructed as needed to carry and/or divert runoff around areas of active mining into existing downstream drainages. The design criteria for the diversion ditches (table I-1) will combine the total expected life of the ditch with the maximum expected 24-hour preciptation event, as defined by the Wyoming Department of Environmental Quality.

TABLE I-1.--Drainage diversion criteria

[Data furnished by applicant]

Ditch life (years)	Recurrence interval for 24-hour precipitation event (years)[1]
3----------	10
3-10----------	25
10-20----------	50
20----------	100

[1]As specified by the Wyoming Department of Environmental Quality.

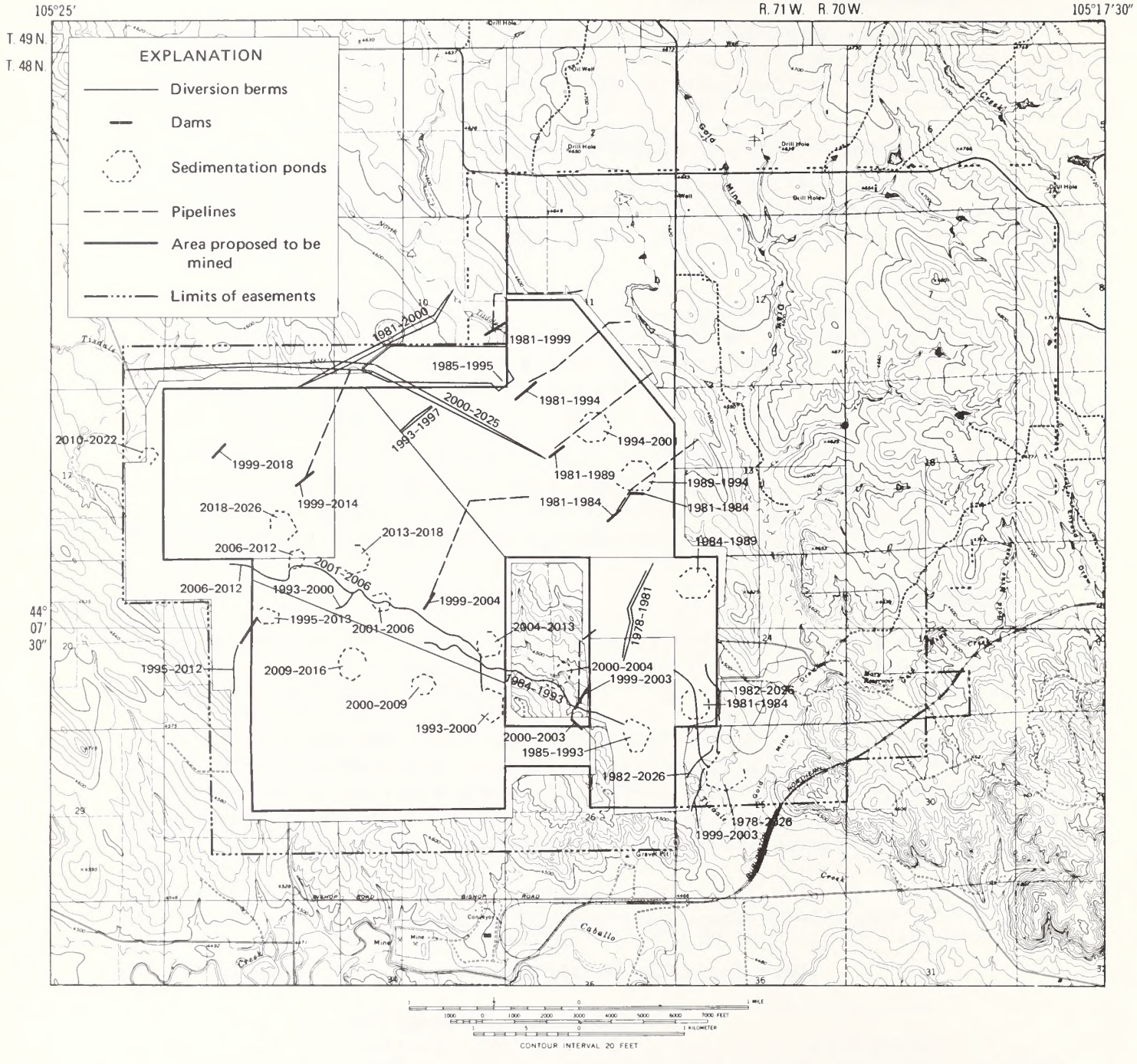

FIGURE I-2.—Proposed progression of runoff segregation and surface water control.

The main diversion ditch will divert runoff from undisturbed areas of the North Tisdale Creek drainage into Tisdale Creek. Smaller ditches will drain runoff from disturbed areas into a sedimentation pond south of the railroad loop. This pond will have a capacity of approximately 30 acre-feet, which is sufficient to retain a 10-year 24-hour event. Sediment will be removed as necessary to maintain a minimum volume of 25 acre-feet. Sediment removed will be analyzed to determine proper disposition. Impounded water will be used for dust abatement so that the available reservoir capacity for retention of a 10-year 24-hour event will be maintained. This procedure for surface water control and segregation of runoff will be repeated using additional ditches and sedimentation ponds as the pits advance (fig. I-2).

Each sedimentation pond will have a spillway adequate to pass the peak flow from a 100-year 6-hour rainfall event with a minimum safety factor of 1.5. The top width of the embankment will comply with the applicable regulations. Final engineering plans will be submitted to Federal and State offices for approval.

A minimum of 12 inches of topsoil will be removed from the pond site; a portion will be placed 6 inches thick on the side slopes of the embankment, and the rest will be stored. After the mining operations are completed the embankment will be removed, the topsoil salvaged, and the area permanently revegetated after placement of all remaining topsoil.

During mining, a sump pump and piping system will remove seepage water from the floor of the active cut and pump the water to settling ponds. All collected surface water and mine seepage water will be stored in a settling pond or ponds as needed (fig. I-2) and will be used as the main supply of industrial water.

3. MINING

Production from the Caballo mine is proposed to begin in 1979. Full production is expected in 1987, when an average of 12 million tons of coal will be mined annually (table I-2). Reclamation will follow mining, with complete restoration of stable vegetation expected within 5 years of initial disturbance. Approximately 130 to 1,200 acres will be disturbed in any 1 year during the mine life. Forty to 530 acres will be reclaimed per year.

Mining will begin in the southeast corner of the minesite (map 2) and proceed to the north and northwest, eventually removing coal from beneath about 4,300 acres. Three pits will be developed during the life of the mine; these pits are labeled A, B, and C (map 2), with the first pit developed being pit A. The planned sequence and timing is consistent with a planned production buildup from 1979 to 1987 to an average of 12 million tons per year (table I-2).

TABLE I-2.--Projections of average yearly coal production, surface disturbance, and employment for the Caballo mine

[Data supplied by applicant]

Topic	pre-1979	1979	1980	1984	1986	1987	1988-2018
Coal production, in millions of tons-----	0	1	3	7	10	12	12
Estimated surface in process of mining and reclamation, in acres----------	260	250	380	480	680	750	940
Estimated surface disturbed by construction of surface facilities, in acres----------	320	0	2	0	0	0	0
Number of unit-trains loaded per week------	0	2	6	14	20	22	22
Number of construction employees----------	277	0	86	0	0	0	0
Number of permanent mining employees-----	85	97	125	180	220	320	360

The method of mining coal (fig. I-3) will be: (a) stripping of topsoil, (b) removal of overburden from the coal seam, (c) coal extraction, (d) placement of overburden and topsoil in the mined-out area, and (e) preparation and seeding of replaced material. Coal will be hauled by trucks to the coal-handling plant and subsequently crushed, sized, and loaded into unit-trains for delivery to the customer.

Mining will begin by making an initial box cut into thin overburden. Topsoil and overburden from the box cut will be stored separately nearby for reclamation of the plantsite at the end of the mine life.

Mining will proceed in a series of subparallel cuts excavated to the coal in a series of benches (fig. I-3). Overburden from each cut will be removed and hauled by trucks to be placed in the previously mined cut. Mining will continue until the minesite shown on map 2 has been worked. Coal haul roads will connect to the center of each panel, and spoil haul roads will be along the ends of the panel.

a. TOPSOIL REMOVAL

Topsoil removal, storage, and redistribution for maximum productivity will be conducted under Wyoming DEQ requirements in accordance with OSM regulations. All available topsoil will be removed with scrapers and either spread on prepared backfilled areas or stockpiled until it can be

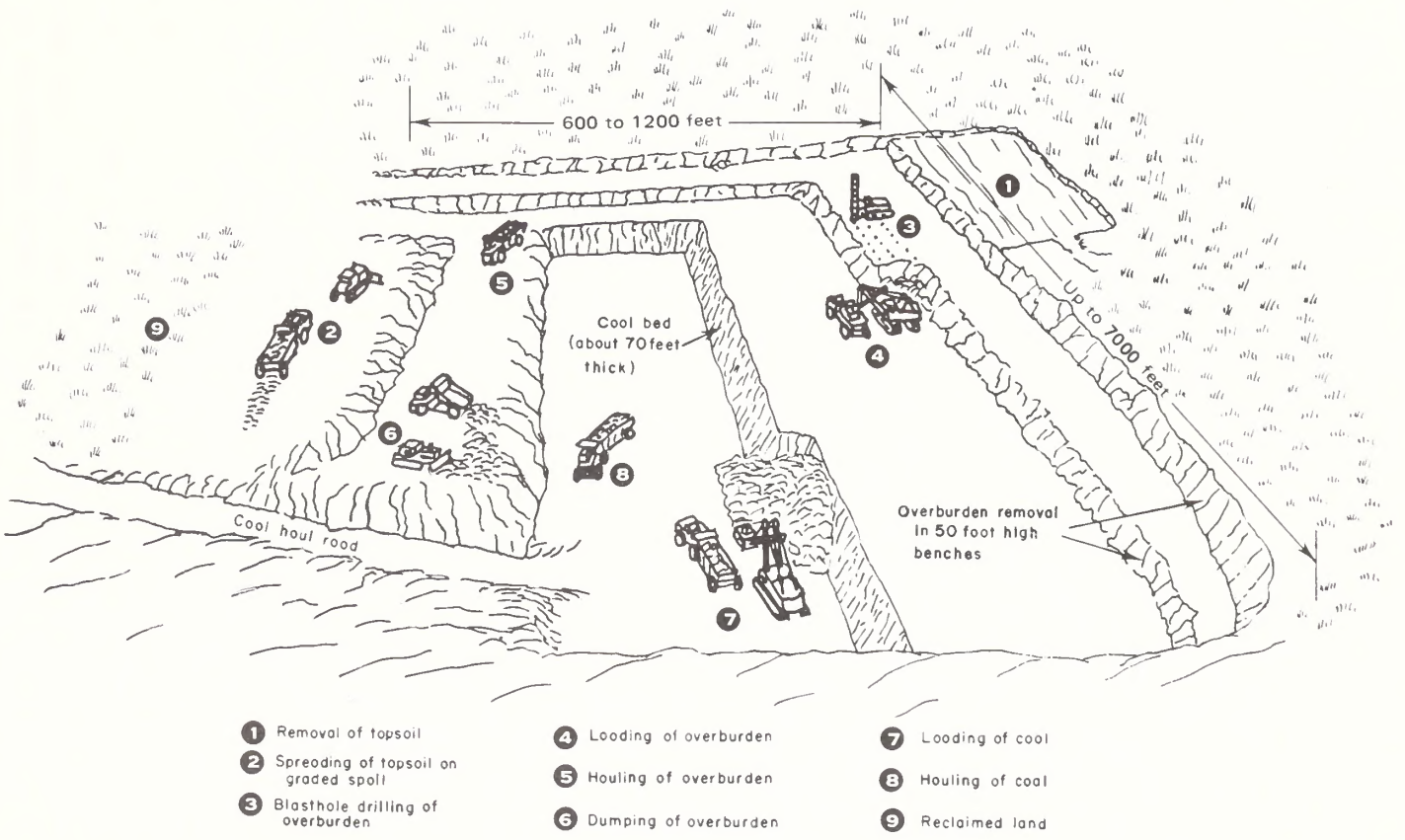

FIGURE I-3.—Schematic diagram showing mining methods and average dimensions to be used at the proposed Caballo mine.

spread directly on shaped backfill areas. Excess topsoil will be stockpiled and used as needed. The actual month-by-month material balances will be used to determine how much is stockpiled and how much is spread. Topsoil that has to be stockpiled for more than a few months will be mulched or seeded with quick-growing cover species to prevent erosion.

b. OVERBURDEN REMOVAL

After scrapers have removed the topsoil, overburden will be drilled and then blasted with a mixture of ammonium nitrate and fuel oil. Blasting will be done only during daylight hours.

Initially, a large electric shovel will strip the overburden. The shovel will operate on approximately 50-foot-high benches and will load into 100- to 180-ton capacity trucks. When the overburden shovel is unable to keep up with overburden removal requirements, additional shovels, draglines, and/or scrapers will be used to remove overburden immediately above the coal.

c. COAL REMOVAL

Coal removal will be initiated by drilling and subsequent blasting with a mixture of ammonium nitrate and fuel oil. Large shovels and front-end loaders will then load coal from the benches into trucks (150- to 180-ton capacity) that will haul the coal to the crusher (fig. I-3).

d. BACKFILL EMPLACEMENT

Once enough coal has been removed and enough operating room exists for maneuvering equipment in the pit, backfilling of the mined-out area will begin. Trucks will haul overburden from the benches to the mined-out area and dump it in designated areas to keep the dump face advancing towards the active mining face. Soil and overburden materials determined to be detrimental to plant growth will be deeply buried. Dozers will initially shape the spoil into the desired configuration, and graders will complete the process.

4. RECLAMATION

The applicant proposes to restore the land to support continued grazing of cattle. Accordingly, the minesite will be shaped into rounded hills or nearly level surfaces that will approximate the original contours. Postmining topography is shown in figure I-4. Reclamation costs are given in table I-3.

Overburden will be dumped and shaped all year round, but seeding and planting will be done only in spring or fall to take advantage of available moisture. All efforts will be made to reclaim the replaced spoils as promptly as possible.

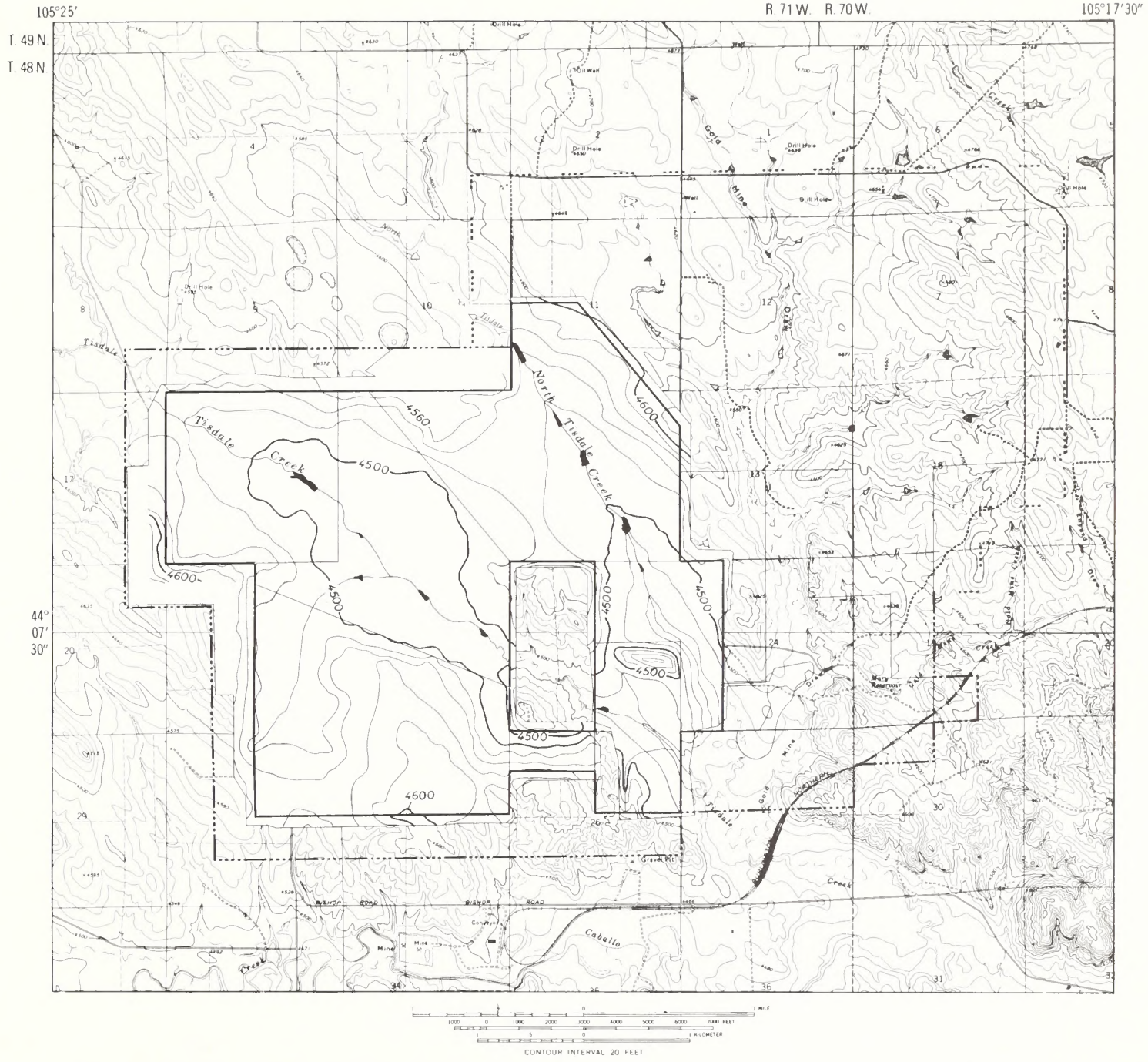

FIGURE I-4.—Map of the proposed minesite showing the postmining drainage and topography of the reclaimed surface. (Boundaries are defined on map 1)

TABLE I-3.--Estimate of the direct cost of reclamation at the Caballo mine

[Data supplied by applicant]

Reclamation operation[1]	Cost per acre[2]
Topsoil removal and distribution	$230
Seeding	350
Fertilizing	9
Surface grading, contouring and topsoil preparation	1,860
Total	$2,449

[1]Backfilling cost ($116,160) is included in the mining cost. Remaining costs are used as the basis for reclamation bond approval by the State of Wyoming.
[2]Based on 1977 prices.

a. SOIL PREPARATION

After the spoil is shaped, a minimum of 12 inches of topsoil will be spread. Haul roads will be reclaimed before replacing topsoil. Then the area will be treated as necessary with a range pitter or similar machine to produce a rough surface that will reduce wind erosion, allow water to accumulate and infiltrate, and enhance establishment and maintenance of the improved seed mixture. Topsoil will not be replaced when it is wet.

b. SEEDING

A hydroseeder will be used on slopes greater than 3H:1V, and a tractor and drill on less steep areas. Seeds of most of the grasses, which are all about the same size, will be planted less than 1 inch deep in sandy soils and about 0.5 inch deep in clayey soils.

Because maximum rainfall is in May and June, seeding will be done early in spring and late in fall. Species that have a high dormancy and require low temperature preceding germination will be seeded before mid-March. During periods when permanent or temporary grass cover cannot be seeded, a temporary cover crop, such as oats and sweet clover, or mulch, will be utilized for stabilization. During periods when neither permanent nor temporary cover can be established, topsoil will be windrowed along contours to reduce erosion. Before seeding, these windrows will be smoothed out again.

The mixture of seeded species will be adapted to the use, climate, and soils of the area. The percentage of each species in the mixture will

thus be varied for different locations. The primary species are all self-renewing. The seeding rate will probably be approximately 9 to 11 pounds of pure live seed per acre; the company's objective from reseeding is to produce a grassland vegetation for livestock that equals or exceeds the amount on undisturbed native range.

The topsoil on backfill areas will be tested to determine fertilizer needs prior to seeding, and fertilizer will be applied at optimum rates at seeding time and after germination. Annual applications of fertilizer are not planned.

Invader species of grasses and forbs and plants of primary succession on bare ground will be controlled during reclamation by mechanical removal. When vegetative cover is established, chemical treatment may be used to improve range quality.

5. HEALTH AND SAFETY

Carter Mining Company must comply with all Federal, State, and local regulations.

Fencing will encompass the perimeter of the operation and will be moved when necessary to accommodate ranching operations and to return reclaimed land to grazing. All entrances to the plantsite and minesite will be marked by clearly legible signs displaying mine-property warnings. The permit area is delineated by painted steel boundary markers. Cattle guards will be installed where required to control domestic livestock at all entrances to the mine.

All blasting will be conducted according to the codes of Mining Safety and Health Administration (MSHA). Ammonium nitrate will be delivered to steel storage tanks by truck or rail and hauled from the storage tanks to the blast area by truck. Primers and other blasting materials will be stored in approved magazines.

Fuel and other flammable materials will be stored and transported according to regulations and accepted safety procedures.

Haul roads will be designed to accommodate anticipated traffic patterns.

Trash and other small items that may be blown by the wind will be stored in closable trash containers. Salvaged machinery and parts will be stored in a fenced junkyard. Waste will be buried at least 4 feet beneath the top of the reshaped spoil surface. Carter Mining Company has obtained a State permit for solid waste disposal.

Sewage treatment facilities will conform to Government requirements. In addition to the septic tank system in the plantsite, chemical toilets will be provided in the minesite.

Part of the proposed mine equipment is a water truck with pumping equipment and hoses. The truck will be available to assist in controlling open fires should they occur in the vicinity. The applicant will arrange with the nearest fire-fighting organization for emergency fire-fighting protection in the event of a large fire. All equipment used in mining will have portable fire extinguishers. Spark arrestors will be used on most equipment.

Coal will be stored a minimum time to minimize the chance of spontaneous combustion, and loose coal will be cleaned up and removed.

Final highwalls will be eliminated and reclaimed to meet existing regulations.

6. MONITORING PROGRAM

The applicant proposes to monitor the mine and to report to the regulatory authorities so as to meet or exceed regulations and statutory requirements applicable to the Caballo mine.

a. SOILS

Soils and other materials will be tested, as proposed under the reclamation plan, to furnish data needed for compliance with regulations and objectives.

b. WATER RESOURCES

Streamflow will be recorded at five sites: on Gold Mine Draw and on Tisdale Creek both above and below the mine, and on upper North Tisdale Creek. All sites will probably have measurable flow only once or twice a year.

Water quality will be sampled weekly during periods of runoff at the sites above and below the mine on both Gold Mine Draw and Tisdale Creek. The water samples will be analyzed monthly for sodium, potassium, calcium, magnesium, sulfate, chloride, carbonate, bicarbonate, total dissolved solids, pH, specific resistivity, specific conductivity, silica, total hardness as $CaCO_3$, turbidity, suspended solids, and total volatile solids.

c. AIR QUALITY

A meteorological and air-quality sampling station on the leasehold has been in operation since May 1976. The equipment, which is 40 feet above the ground to avoid surface effects, continuously monitors and records temperature, rainfall, relative humidity, barometric pressure, wind speed, and wind direction. The system is operated by Ecology Audits, Inc., Casper, Wyoming.

d. VEGETATION AND WILDLIFE

The company will monitor vegetation and wildlife in accordance with Federal and State requirements.

e. CULTURAL RESOURCES

The company has completed archeological and historical surveys on the leasehold and intends to be alert to any discovery of unknown cultural resources and to take required actions to report and preserve any such resources discovered during operation.

C. ENVIRONMENTAL CONSTRAINTS

Those mitigating measures specifically required by law or volunteered by the applicant are considered to be a part of the proposed Federal action. Mitigating measures not specifically required by law but within the discretionary powers of the official responsible for applying the law, such as the Regional Director, OSM, the BLM District Manager, and the Chief of the Land Quality Division of the Wyoming Department of Environmental Quality--if the responsible official has provided written documentation that the mitigating measure(s) will be required if the applicant's proposal is approved--are also considered to be part of the proposed Federal action.

Additional mitigating measures that may be desirable but that are not specifically required by the law are included in chapter VIII (Alternatives) of this environmental statement.

No county or local requirements apply directly to mining. Applicable laws and regulations, as of 1979, are summarized in "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979, p. R3-1 to R3-14).

The proposed mining and reclamation plan complies with Federal Regulation 30 CFR 211 (coal mining operating procedures, May 1976). However, the proposed plan does not comply with the initial regulatory requirements under the Surface Mining Control and Reclamation Act of 1977 or with surface mining reclamation standards established by the Wyoming Environmental Quality Act of 1973. The latter were adopted by the Federal Government for leases in Wyoming through a cooperative agreement with the State for the enforcement and administration of reclamation of Federal leases (44 FR 12052, 1979). The Caballo mining and reclamation plan has been revised and is in the final review process by Wyoming DEQ to bring it into conformance with State regulations as covered by the cooperative agreement.

1. MINING

Specific measures proposed by Carter Mining Company have been described under the drainage, mining, reclamation, and health and safety sections of this chapter.

Current engineering design procedures include surface water impoundments that meet Wyoming State Engineer's Office criteria and applicable MSHA criteria; supply or diversion ditches that meet applicable State Engineer's Office criteria; construction and minesite drainage controlled by sedimentation ponds to meet effluent discharge limitations, with each sedimentation basin sized to the capacity of a 10-year 24-hour rainfall event; roads and ditches designed to cross streams at right angles; separation and disposition of acid or toxic materials in accordance with applicable regulations; surveyed profiles and cross sections prepared for all access roads constructed; and warning signs, fencing, flagmen, barricades, and other safety and protective measures that may be necessary during road construction.

Waste material from mining operations will be disposed of in accordance with Wyoming requirements.

Oil, gas, or water wells will be abandoned in accordance with rules and regulations of the Wyoming Oil and Gas Conservation Commission and the Wyoming State Engineer's Office. When mining through well sites, the applicant will ensure that the well has been or will be properly plugged below the coal beds that are to be mined. Plugging procedures will be in accordance with Wyoming and Federal regulations. For example, the applicant may: (a) drill out near surface plugs to below the base of the coal to be mined, (b) set fresh cement plugs below the base of the coal pit, and (c) cut off the casing above the new plug at the base of the coal pit.

Federal controls include:

- Leasing and Operating Regulations;
- 30 CFR Part 211 (Coal Mining Operating Regulations);
- 30 CFR 700 (Surface Mining Control and Reclamation Act);
- 30 CFR Part 216; and
- 43 CFR Part 3041 (Surface Management of Federally Owned Coal Resources).

State controls include:

- The Open Cut Land Reclamation Act of 1960, and rules and regulations promulgated under this act;
- The Wyoming Environmental Quality Act of 1973; and
- The Industrial Development Information and Siting Act of 1975: requires permit to construct mine plant facilities.

Under section 523(c) of the Surface Mining Control and Reclamation Act of 1977 a cooperative agreement between the Department of the Interior and the State of Wyoming for the enforcement and administration of surface coal mine regulations on Federal lands was signed on October

26, 1978 (42 FR 3642, 1978). Under terms of this agreement, administration and enforcement of that law as it relates to Federal lands were delegated to the State of Wyoming. A permit to mine by the Wyoming Department of Environmental Quality, Land Wuality Division, is also required under the Wyoming Environmental Quality Act of 1973.

The agreement requires that first the State and then the Department of the Interior approve a proposed mining and reclamation plan. However, the Department can proceed with all the steps required in its decisionmaking process, including preparation of an environmental impact statement, while the State is considering the proposed plan.

The leases require that reclamation be concurrent with mining, and that the reclaimed land be capable of supporting all the practical uses it could support before mining.

Efforts to stabilize the overburden must be made in the minesite, and toxic substances must be prevented from leaching into the ground water. The land must be reclaimed to approximately its original contour. Highwalls and spoil piles must be shaped to meet existing regulations. All disturbed areas must be stabilized and protected from erosion. Topsoil must be removed and used to reclaim mined land. Soil stockpiles must be protected from erosion.

Permanent water impoundments must be adequate for intended use, the quality of the water must be suitable for intended use, access must be safe and adequate, and water resources around the impoundment must not be adversely affected. Auger holes must be plugged or covered with non-combustible material. Surface- and ground-water quality and quantity must be disturbed as little as possible.

All waste must be disposed of to avoid pollution or fire hazard.

Facilities such as roads, powerlines, and pipelines must be reclaimed so as to minimize pollution and disruption of the environment.

Reclamation must include reseeding in accordance with the approved reclamation plan.

Access must be allowed to the leasehold for all lawful purposes unless a safety or health hazard would be created. In areas of active operation, access and grazing must be regulated to protect the public, wildlife, and livestock from hazards. In areas of inactive operations, all excavations and holes must be filled or covered to eliminate hazards.

2. SUPERVISORY RESPONSIBILITIES OF THE BLM, OSM, AND USGS

The BLM issues Federal mineral leases and issues licenses or permits for other uses of Federal lands. Performance standards of the lease are summarized above. Section 5 of the leases provide for protection of the surface and reclamation of the land. BLM requires (43 CFR 3504-5-1) bond

of $75,000, which covers compliance with all of the lease terms. The bond may be adjusted so that increases in estimated compliance costs are adequately covered. The State of Wyoming, on January 12, 1978, set bond (Wyoming S.L. 516278, permit No. 433) at $4,017,000 for the proposed Caballo mine.

The Office of Surface Mining (OSM) approves or disapproves mining plans with the concurrence of BLM and USGS. In Wyoming, the State signed a cooperative agreement under SMCRA with the DOI which gives the State regulatory authority (SRA) authorization to carry out inspection and enforcement activities on Federal coal lands, in accordance with the provisions of the agreement, SMCRA, and State law (44 FR 12052, 1979).

The OSM or the SRA, as appropriate, (1) inspects the mine to ensure that the operator is in compliance with all applicable performance standards, lease requirements for reclamation, and notices or orders relating to environmental and reclamation requirements; and (2) is responsible for enforcement procedures, including issuance of orders of cessation, notices of violations, orders to show cause, and assessment of penalties.

Reports of the OSM-SRA findings and recommendations are available for public inspection at the appropriate OSM regional office.

The District Manager of the BLM and the Area Mining Supervisor of the USGS also make inspections to ensure that requirements under FLPMA and various mineral leasing laws are met, and they report any violations to the OSM. The Area Mining Supervisor of the USGS inspects the mine to ensure that the operator is in compliance with diligent development and maximum economic recovery requirements and that the royalty payments are accurate. To the maximum extent possible, all inspections by OSM or the State regulatory authority and the USGS and/or BLM will be coordinated to reduce duplication of effort.

The mine operator must inform the regulatory authority as soon as possible whenever an accident degrades the environment or injury occurs, or whenever an alteration is made in the mine plan.

3. SAFETY

Federal controls include:

- Federal Coal Mine Health and Safety Act, 1969; and
- Occupational Safety and Health Act, 1970.

4. PALEONTOLOGY

The applicant proposes to alert all equipment operators and others who have occasion to be in the mine that potentially valuable fossils may be found. The reclamation specialist assigned to the operation will be

specifically responsible for finding and drawing attention to those of potential interest.

The BLM has recently issued interim instructions for the protection of paleontological resources on Federal lands. These include technical guidelines to define the resources and to provide evaluatory criteria and measures for protection.

5. WATER RESOURCES

Federal and State laws and regulations concerning water-quality standards include:

- Federal Water Pollution Control Act, as amended in 1972;
- Wyoming Environmental Quality Act of 1973; and
- Water Quality Standards for Interstate Water in Wyoming.

Wyoming water law requires water-right filings for water impoundments and for general utilization of ground or surface water. If mining interferes with existing ground or surface water rights, the company may be required to provide water to satisfy these rights. Provisions under Wyoming water law make it possible to change the location of wells, reservoirs, or irrigated lands affected by mining without affecting these water rights.

The water law will also require the applicant to obtain a permit from the Wyoming State Engineer to construct the proposed diversion system.

6. AIR QUALITY

Mining must comply with applicable State and Federal air-quality laws and standards (FES 79-17, April 1979) including:

- Federal Clean Air Act, as amended;
- National Ambient Air Quality Standards;
- New Source Performance Standards (NSPS);
- National Emissions Standards for Hazardous Air Pollutants;
- 40 CFR Part 50;
- 40 CFR Part 51;
- 40 CFR Part 52, Subpart 22, Wyoming;
- 40 CFR Part 60; and
- Wyoming Ambient Air Quality Regulations, as amended.

The Caballo mine will have to meet the Prevention of Significant Deterioration Section (PSD) of the Clean Air Act, which became effective June 19, 1978. Thus, the company has applied for a permit from the Environmental Protection Agency (EPA) that requires demonstrated compliance with the PSD regulations.

7. WILDLIFE

The following regulations apply to wildlife on the Caballo mine:

- Fish and Wildlife Coordination Act--16 USC 662. Whenever a Federal department or agency proposes to impound, divert, deepen, or otherwise control or modify any stream or body of water, that department or agency must first consult with the Fish and Wildlife Service.

- Bald Eagle Protection Act--16 USC 568c. This act prohibits taking, transporting, or destroying bald or golden eagles, their eggs, or nests.

- Endangered Species Act--16 USC 1531-1543. This act requires Federal agencies to consider possible adverse effects of their action on endangered species or their habitat(s). Consultation with the Fish and Wildlife Service is required if there is a possibility of the presence of endangered species, or if the authorizing agency is unable to document satisfactorily that the presence of an endangered species is not possible.

- Migratory Bird Treaty--16 USG 703-705. A permit must be obtained by the applicant from the Fish and Wildlife Service to allow the disturbance of migratory birds and their nests.

- Wyoming Land Quality Rules and Regulations, Chapter II, Section ib(3). Operators are required to restore wildlife habitat whenever possible.

8. CULTURAL RESOURCES

To ensure compliance with legislative and administrative obligations (FES 79-17, April 1979), all investigations will be reviewed by the applicant, representatives of OSM and BLM, and the State Historic Preservation Officer (SHPO). The significance of homestead structures will be assessed through detailed studies including test excavations at selected sites. Eligible sites if found will be nominated to the National Register of Historic Places. The applicant will be responsible for protecting sites that were not detected during field examinations from damage until they can be examined by a qualified archeologist and salvaged if they are sufficiently valuable. The applicant will notify the regulatory authorities of discovery of sites during mining.

9. VISUAL RESOURCES

BLM, as the surface-management agency, will require or recommend that the applicant:

- Use colors on equipment and buildings that blend with the existing landscape, i.e., natural, unpainted, oxidizing metals, and non-reflective colors and materials (unless governed specifically by FAA regulations).

- Place transmission lines along contours, not silhouetted, use wood or oxidizing metals, and cross roadways at right angles.

- Use contour and natural lines in revegetation with edge feathering and native vegetative species.

- Place roads and railroads along contours, where practical.

CHAPTER II

DESCRIPTION OF THE ENVIRONMENT

A. TOPOGRAPHY

The proposed Caballo mine is in the central part of the Powder River Basin. The terrain is an upland with low rolling hills which increase in ruggedness to the east (fig. II-1). Maximum relief is about 300 feet; the maximum elevation is 4,800 feet, along the eastern leasehold boundary, and the minimum elevation is 4,500 feet, where Tisdale Creek leaves the leasehold. Slopes are usually less than 10 percent in the western half, and as much as 40 percent in the eastern half of the leasehold.

The proposed mine is dissected by three ephemeral streams with narrow valley floors and relatively steep valley walls. The westernmost valley is occupied by Tisdale Creek, which flows southeastward, as does North Tisdale Creek, located approximately 1 mile to the east. The creek in the easternmost valley, Gold Mine Draw, flows southward.

Several dried-up, vegetation-free areas are present in the upland. These flat, shallow depressions range in diameter from less than 100 feet to approximately 660 feet and are located in places of thick overburden, suggesting that most of them were formed by wind erosion rather than by subsidence.

B. GEOLOGY AND MINERAL RESOURCES

1. GEOLOGIC RELATIONSHIPS

The proposed mine is located in the Gillette coal field in the Belle Fourche Basin on the gently west-dipping eastern flank of the Powder River Basin (fig. II-2). Regional descriptions of the geology and coal are found in FES 79-17, April 1979). Studies by the USGS in central Campbell County provide basic information about the land and its resources (Keefer and Hadley, 1976).

The site proposed for the Caballo mine is just west of the contact between the Wasatch Formation and the underlying Fort Union Formation (fig. II-2). The Wasatch is known on the Caballo site to comprise fine- to medium-grained sandstones interbedded with siltstones, carbonaceous shales, gray claystones and shales, and numerous coal beds.

The coal to be mined averages 70 feet thick and ranges from 0 to 75 feet thick (fig. II-3). The applicant defines this coal bed as the Smith coal, but studies by Denson and others (1973) and Grazis (1977) suggest that this may be the Wyodak coal bed in the Fort Union Formation.

Rocks comprising the Fort Union Formation below the coal bed are predominantly carbonaceous claystones, shales, and siltstones, interbedded with lenses of fine-grained to conglomeratic, friable sandstone and thin coal beds of little economic worth.

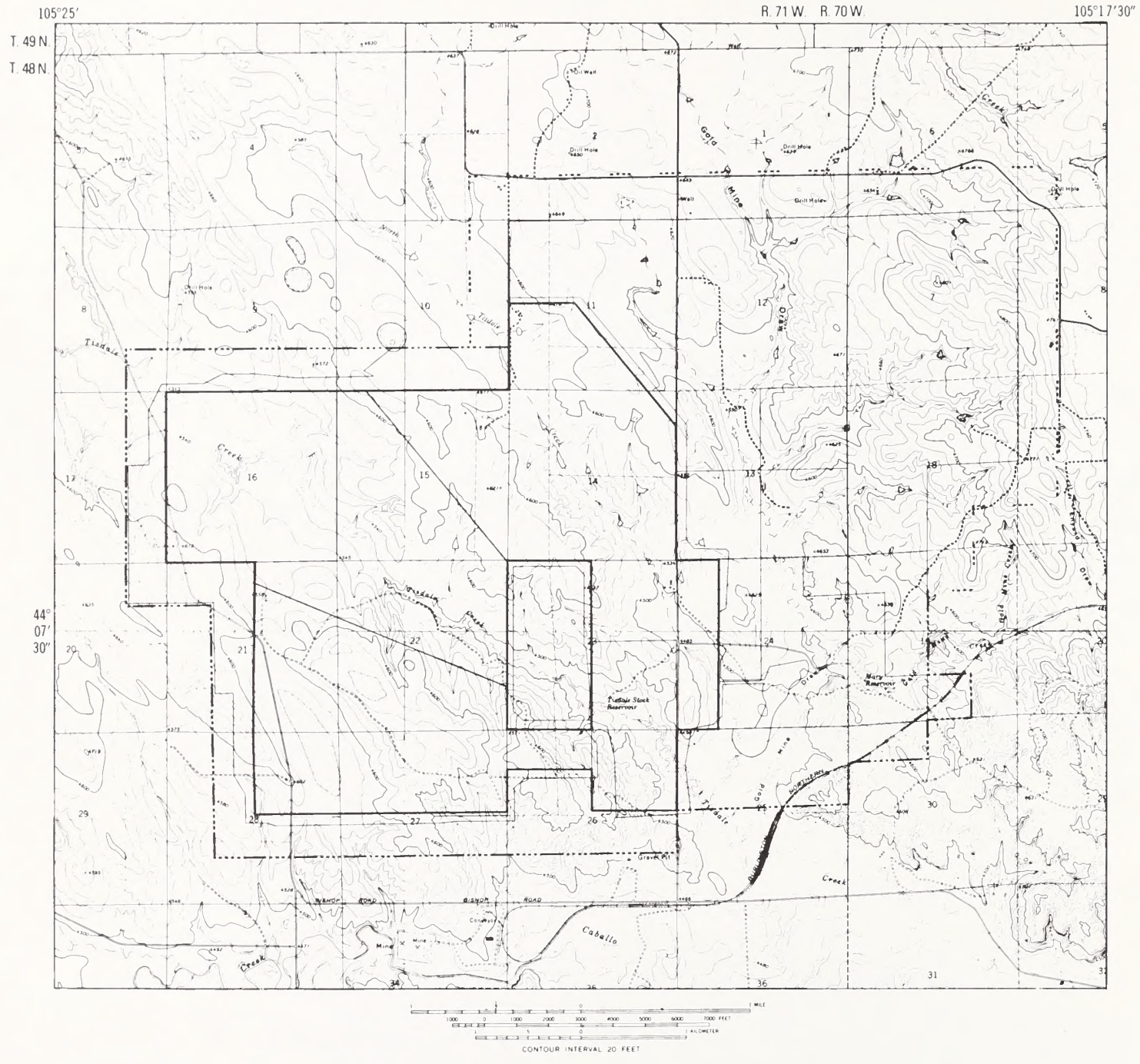

FIGURE II-1.–Topographic map of the proposed Caballo mine and surrounding area.
(Boundaries are defined on map 1)

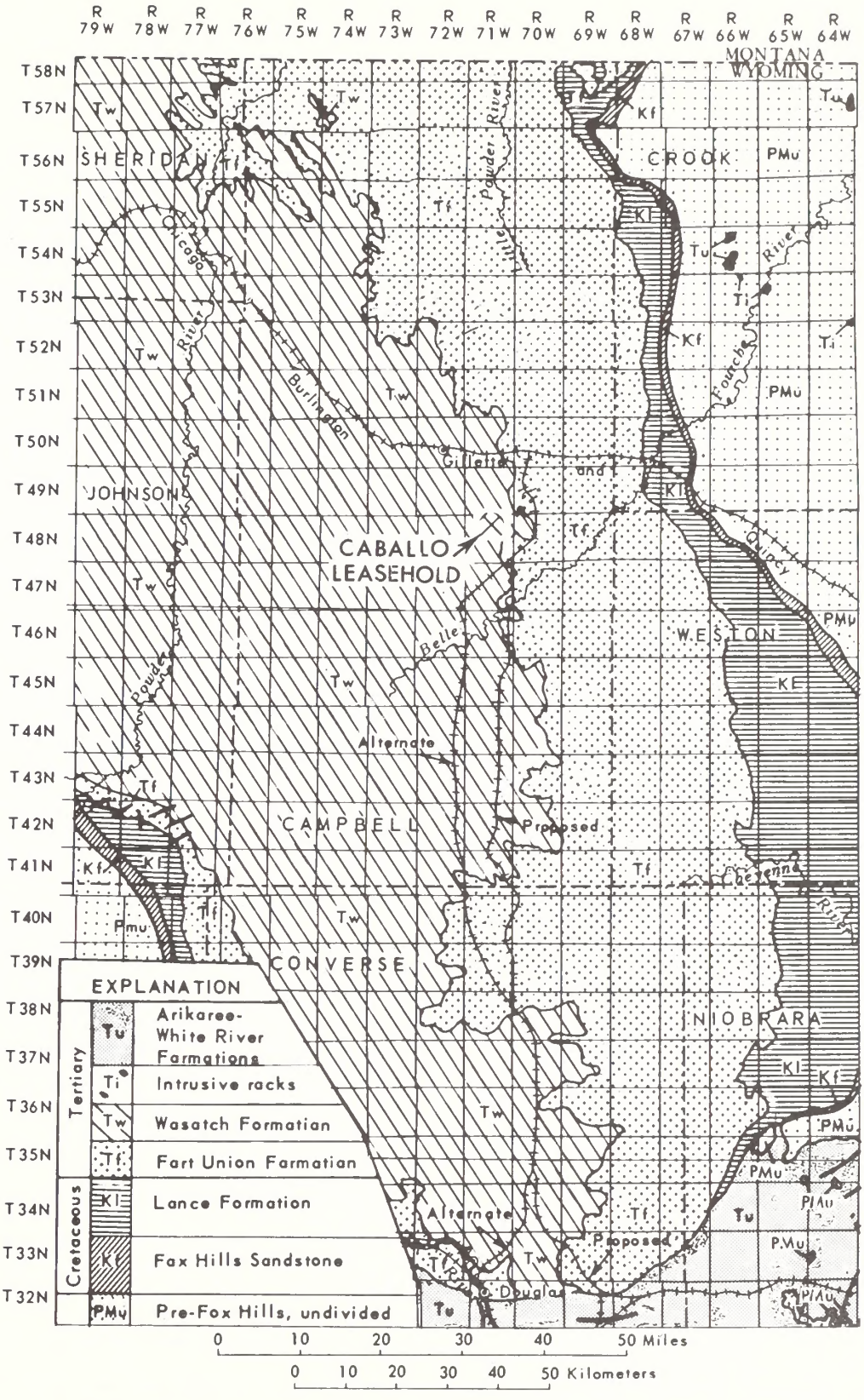

FIGURE II-2.—Generalized geologic map of the eastern Powder River Basin (from FES 74-55).

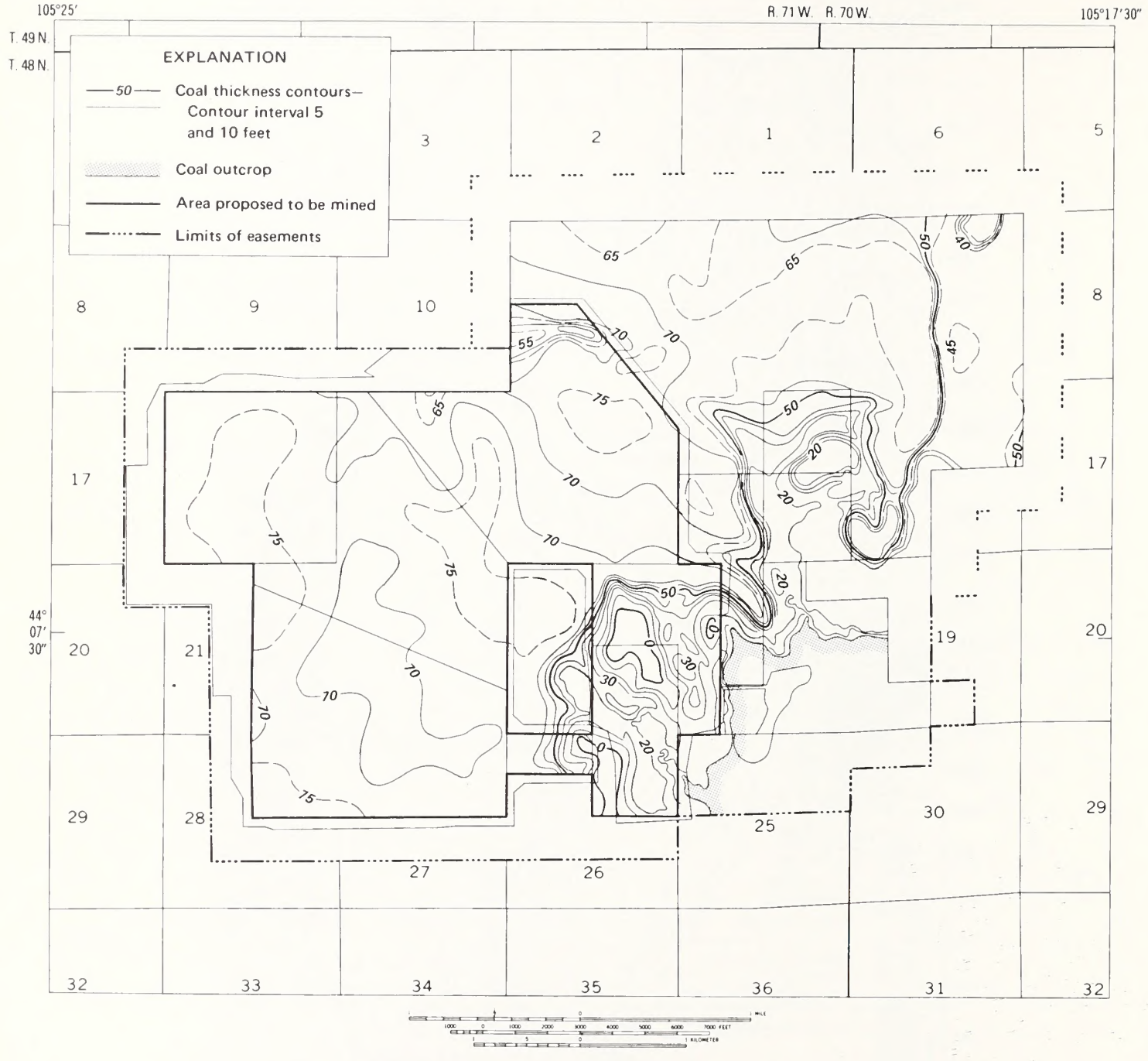

FIGURE II-3.—Map showing the thickness of the coal bed to be mined in the proposed Caballo mine. (Boundaries are defined on map 1)

2. GEOLOGIC HAZARDS

The proposed mine contains no significant geologic hazards and is in an area of low seismic activity. Between 1853 and 1973, only 15 earthquakes with maximum intensities of V to VII (Modified Mercalli Intensity Scale) were reported within 200 miles of the leasehold. Data collected by a network of seismic recording stations in existence since the mid-1960s, support the conclusion that the region is seismically inactive.

3. OVERBURDEN

The overburden, which will be removed during mining, consists primarily of rocks of the Wasatch Formation. In some areas to be stripped, the overburden includes a thin layer of unconsolidated material.

The thickness of the overburden ranges from near zero to about 275 feet (fig. II-4) and averages about 140 feet. It is thickest in the extreme western part of the mine. Undisturbed overburden density is about 3,100 lbs/yd^3.

Analyses of 32 core samples from 13 locations show that overburden pH values range from 7.2 to 8.8 and that most samples contain small amounts of both nitrogen and phosphorous. The sulfur content is low, generally less than 0.5 percent. No toxic chemical elements are present in amounts deserving special attention.

4. COAL

The coal underlying the property is a low-sulfur coal of subbituminous "C" rank (table II-1). The 463 million tons of coal, proposed to be mined by the applicant, represents 0.04 percent of the estimated 1.2 trillion tons of reserves for the whole Powder River Basin (R. W. Jones, written commun., 1976) and 2.36 percent of the 21.2 billion tons of strippable reserves of the Powder River Basin calculated by Glass (1975, table 7, p. 19). Along the southwestern boundary of the mine, the coal bed is slightly more than 75 feet thick (fig. II-4). The relationships of the coal to the overburden in the proposed Caballo mine are shown on the cross sections (fig. II-5). Coal resources and bed relationships are discussed in Grazis (1977) and Denson and others (1973).

5. PETROLEUM AND NATURAL GAS

There are 13 plugged and abandoned petroleum wells within the proposed mine area.

6. OTHER GEOLOGIC RESOURCES

Clinker is available in adequate quantity to provide road metal and ballast for mine roads. In certain areas of the property, where all minerals were reserved to the Federal Government, clinker must be obtained

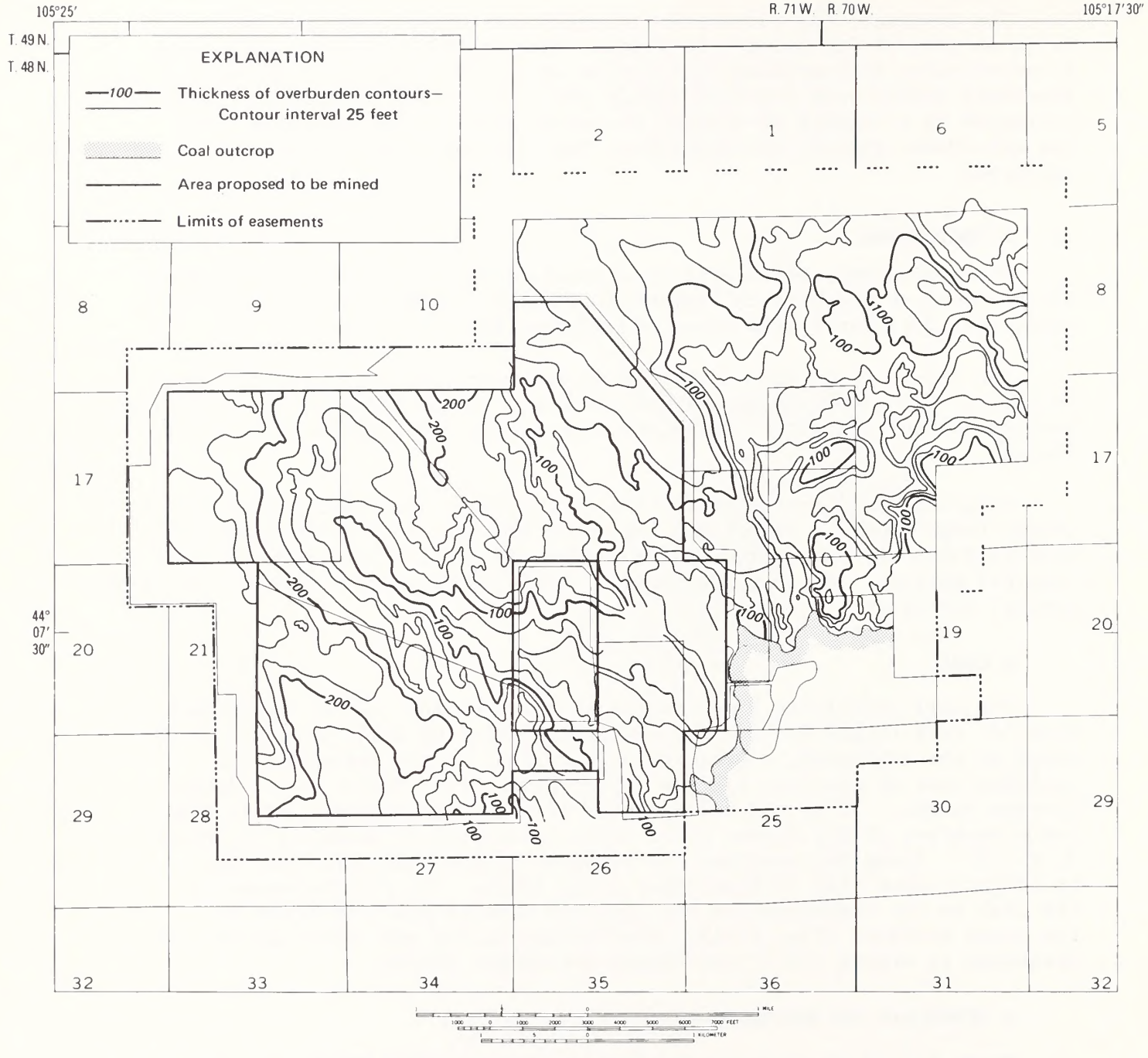

FIGURE II-4.—Map showing the thickness of overburden above the coal in the proposed Caballo mine. (Boundaries are defined on map 1)

TABLE II-1.--Range and typical values of analyses from 55 samples[1] of coal from the coal bed to be mined in the proposed Caballo mine

[Data supplied by applicant. All analyses except Btu are in percent]

Type of analysis	Typical	Range[2]
Proximate analysis (as received):		
Moisture	30.47	29.44-31.51
Ash	7.91	5.85- 9.98
Volatile Matter	30.43	29.08-31.78
Fixed Carbon	31.19	26.73-35.63
Sulfur	0.35	0.29- 0.32
Total	100.35	----- -----
Btu	7,977	7,592-8,363
Ultimate analysis (as received):		
Moisture	30.47	29.33-31.51
Carbon	46.27	44.01-48.54
Hydrogen	3.26	3.09- 3.43
Nitrogen	0.71	0.64- 0.78
Chlorine	0.03	0.01- 0.05
Sulfur	0.35	0.29- 0.42
Ash	7.91	5.85- 9.98
Oxygen	11.17	10.46-11.88
Total	100.17	----- -----
Alkalies as Na_2O (dry coal basis)	0.81	0.79- 0.83
Equilibrium moisture	29.14	28.01-30.27
Hardgrove grindability index	51.50	48.72-54.2

[1]Samples analyzed include top and bottom rock (about 5 inches) that would be mined with the coal.

[2]Range is 1 standard deviation from the typical or arithmetic mean value of the 55 samples.

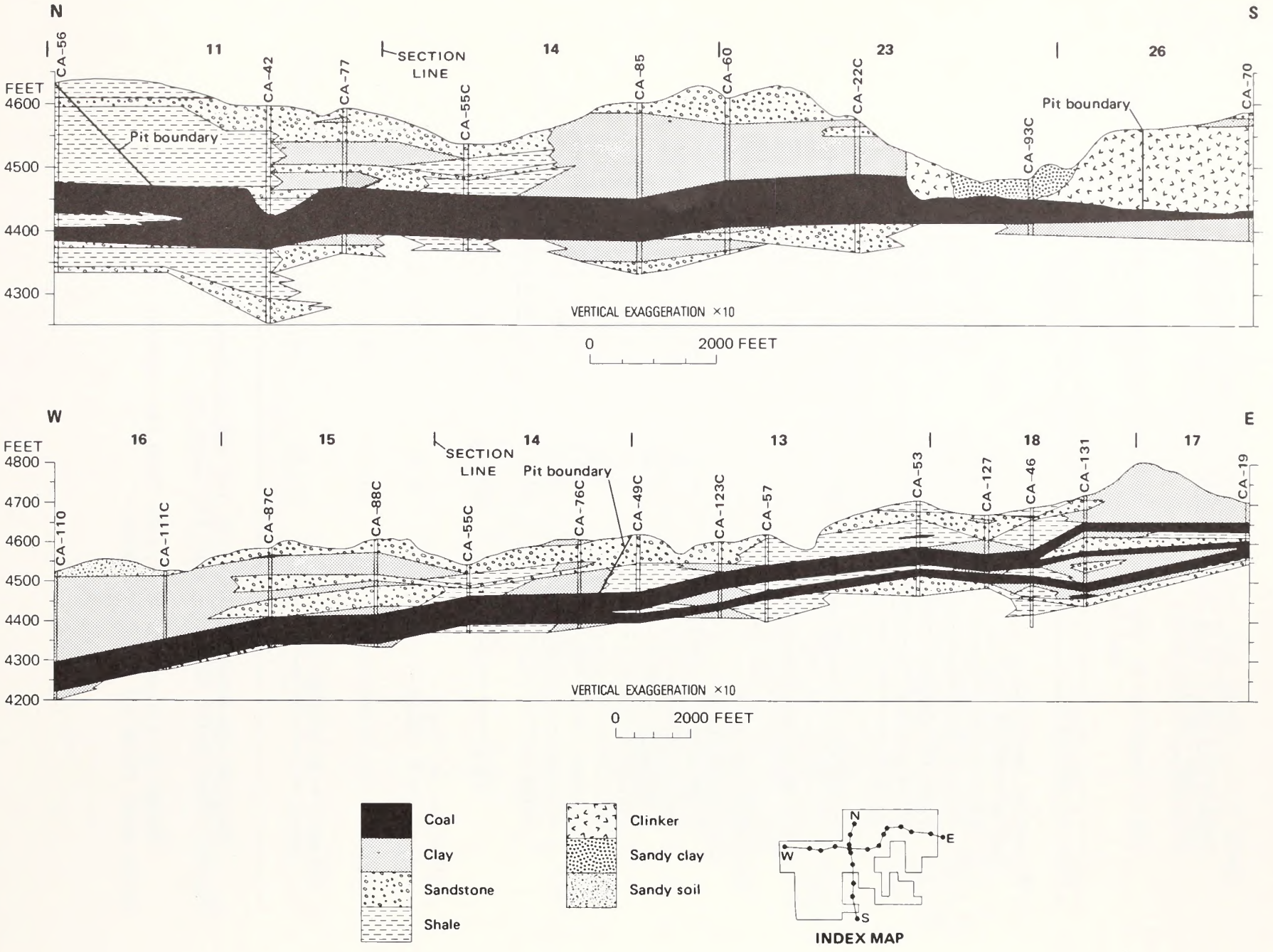

FIGURE II-5.—Cross sections showing coal bed in Caballo leasehold.

through the BLM by sale under the Materials Act (30 U.S.C. 601-604); otherwise the ownership of the clinker resides with the Carter Mining Company. Sand and gravel occur in Gold Mine Draw, North Tisdale Creek, and Tisdale Creek. No uranium has been found in the vicinity of the Caballo mine, although it is known to occur in the Wasatch and Fort Union Formations near Douglas, Wyoming.

7. PALEONTOLOGY

Vertebrate, invertebrate, and botanical fossils have been reported in both the Wasatch and Fort Union Formations. The mine has not been surveyed for paleontological resources. A general summary of the paleontology in the upper stratigraphic section of the region is presented in table II-2.

TABLE II-2.--Summary of fossiliferous formations in the area of the proposed Caballo mine

Formation	Age	Known fossil localities	Type of fossils[1]
Wasatch-------	Eocene	General[2]	V, I, P
Fort Union----	Paleocene	General	V, I, P

[1]V = Vertebrate; I = Invertebrate; P = Paleobotanical.

[2]General = Formation contains fossils throughout Wyoming; specific localities are not identified.

C. SOILS

Soils on the proposed mine are varied, but loamy and clayey soils are the most common. Most of these soils contain sufficient plant nutrients for most range uses. Soils on steeper slopes are thinner, lighter in color, and lower in organic matter than those on gentler slopes. Reddish, shaly soils occur near clinker outcrops.

A soils map of the proposed Caballo mine was prepared by the applicant in 1977 (map 3, in pocket); the soil units are defined and rated according to their suitability for use as topsoil in the reestablishment and maintenance of vegetation (table II-3). Detailed soils studies furnished by the applicant are on file with the Wyoming DEQ.

D. WATER RESOURCES

1. GROUND WATER

Water has been produced from depths as great as 4,200 feet in this part of Wyoming. Strata that are or include aquifers are, from shallowest to deepest, the recent stream-channel sands and clinker, the Wasatch,

TABLE II-3.--Soils units mapped in the Caballo mine

[Data supplied by applicant]

Map symbol	Definition	Rating as topsoil
1A-----	Heavy clays 60 inches----------	Unsuitable
1D-----	Heavy clays 20 inches----------	Unsuitable
3A-----	Friable clay loams 60 inches----------	Fair
3B-----	Friable clay loams 40-60 inches----------	Fair
3C-----	Friable clay loams 20-40 inches----------	Fair
3D-----	Friable clay loams 20 inches----------	Fair
3AW----	Clay loams wet in root zone 60 inches-------	Poor
3SA----	Clay loams with salinity in profile 60 in.--	Unsuitable
3SD----	Clay loams with salinity in profile 20 in.--	Unsuitable
3PB----	Clay loams with channery[1] chips 40-60 in.---	Good
6A-----	Sandy loams 60 inches----------	Good
6B-----	Sandy loams 40-60 inches----------	Good
6C-----	Sandy loams 20-40 inches----------	Good
6D-----	Sandy loams 20 inches----------	Good
61A----	Sandy clay loams 60 inches----------	Good
61B----	Sandy clay loams 40-60 inches----------	Good
61C----	Sandy clay loams 20-40 inches----------	Good
61D----	Sandy clay loams 20 inches----------	Good
61RB---	Sandy clay loams, reddish subsoils 40-60 in.	Good
61RC---	Sandy clay loams, reddish subsoils 20-40 in.	Good
6SA----	Sandy loams with salinity in profile 60 in.-	Fair
6PC----	Channery sandy loams 20-40 inches----------	Good
7A-----	Loams 60 inches----------	Good
7B-----	Loams 40-60 inches----------	Good
7C-----	Loams 20-40 inches----------	Good
7D-----	Loams 20 inches----------	Good
7PA----	Channery loams 60 inches----------	Good
7PB----	Channery loams 40-60 inches----------	Good
7PC----	Channery loams 20-40 inches----------	Good
7PD----	Channery loams 20 inches----------	Good
7PSA---	Channery loams with salinity in profile 60 inches----------	Good
8A-----	Very sandy soils 60 inches----------	Fair-poor
8C-----	Very sandy soils 20-40 inches----------	Fair-poor
8D-----	Very sandy soils 20 inches----------	Fair-poor
RB-----	Rough broken, sandstone and mudstone outcrops, with variable small pockets of soil material of variable textures--------	Unsuitable
SS-----	Sandstone outcrops----------	Unsuitable
PS-----	Porcelanite[2]-sandstone outcrops----------	Unsuitable
P------	Largely exposures of porcelanite and clinkers----------	Unsuitable

[1]Thin flat gravel. [2]Fused shale.

Fort Union, and Lance Formations, and the Fox Hills Sandstone (fig. II-2). The Dakota Formation, which also is a potential aquifer, is about 4,000 feet below the Fox Hills Sandstone.

a. STREAM-CHANNEL SANDS

Stream-channel sands occur along some reaches of Tisdale Creek, North Tisdale Creek, and Gold Mine Draw. These sands are probably less than 15 feet thick, and do not contain water everywhere. For instance, the sands along Tisdale Creek are saturated upstream from the mine plantsite. Just west of the mine plantsite, Tisdale Creek crosses a large clinker deposit which drains the sands. It is postulated that the clinker also drains some of the Wasatch aquifer causing the trough in the potentiometric surface in sections 23 and 26 (fig. II-6).

Even where the lower part of the sands is saturated, the saturated zone is thin, loss to evaporation is high, and the sands do not form reliable aquifers. No wells are known to tap these deposits.

b. CLINKER

Clinker (scoria) in and near the proposed mine (map 2) may contain considerable quantities of water. Harshbarger and Associates (written commun., March 1975) estimated that section 23, T. 48 N., R. 71 W. contains at least 40 feet of saturated clinker. A considerable part of another large clinker deposit just south, in section 26, is probably saturated. These two clinker deposits are probably not hydraulically connected. Several feet of saturated clinker may be present near the corner of sections 18 and 19, T. 48 N., R. 70 W., and sections 13 and 24, T. 48 N., R. 71 W. This saturated clinker may extend from the coal outcrop line north to another deposit of clinker in section 13. The permeability of saturated clinker is probably several times greater than the sandstone in the overburden.

c. WASATCH FORMATION (OVERBURDEN)

Sandstone channels and lenses in the Wasatch Formation overburden form discontinuous aquifers. The movement of water in this aquifer is restricted by interbedded shale units and by variations in the permeability of the sandstone. This aquifer system is tapped by a few wells within the area. These wells reportedly yield as much as 14,000 gallons per day, although yields of 3,000 to 7,000 gallons per day are more common. A short-duration pump test conducted on well CA-175 (fig. II-6), which taps overburden, produced 100 gallons within 35 minutes. While yield values for the Wasatch aquifers cannot be expected to be uniform in the area, the well yield values are probably indicative of the productivity of the aquifer.

Recharge to the sandstones in the overburden occurs west of the surface water drainage divide. Ground water, except for that moving down into the coal, or discharged by wells, springs, and evapotranspiration, moves south and east into the Belle Ayr leasehold. The hydraulic gradient in the overburden aquifer ranges from about 15 to 60 feet per mile (fig. II-6).

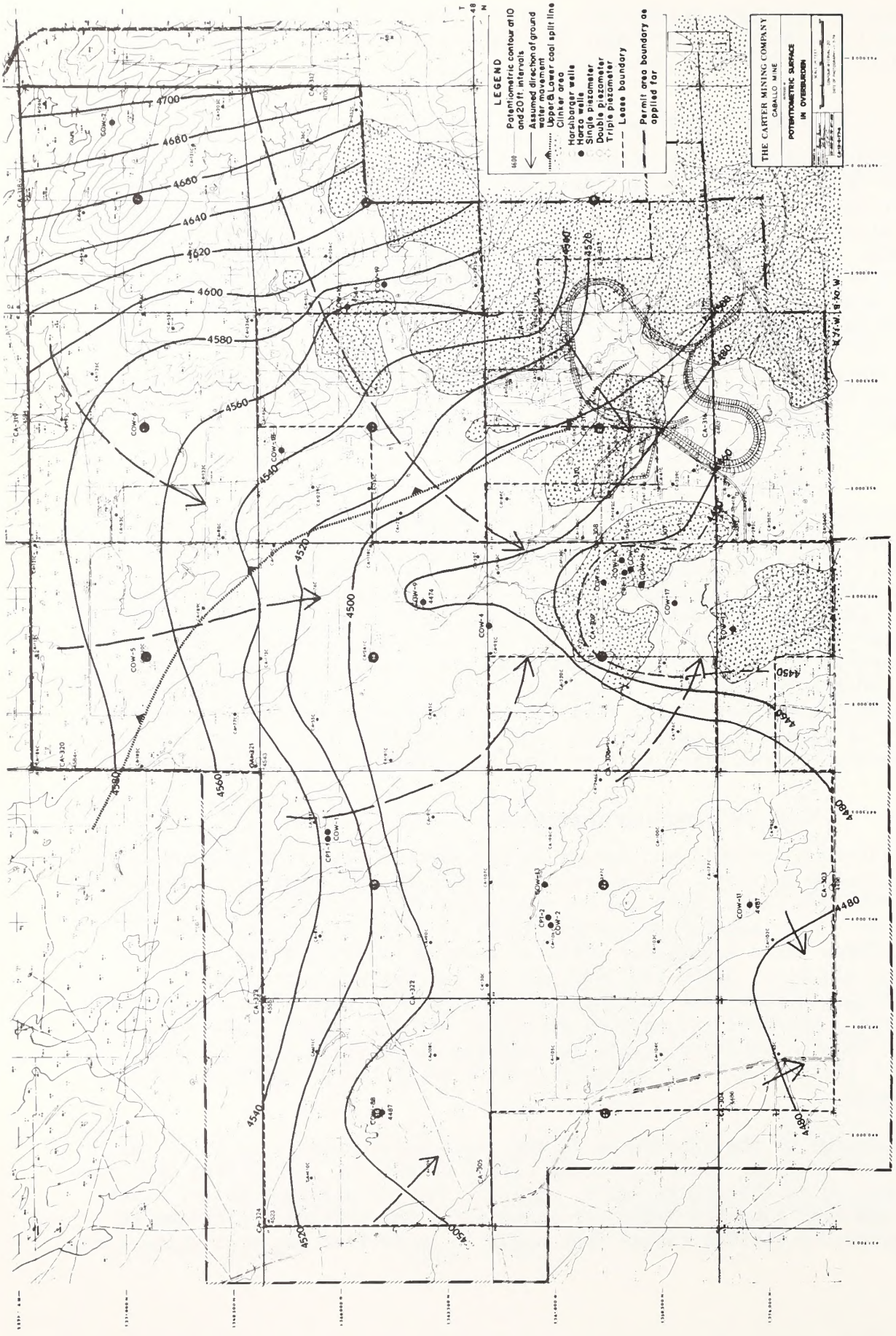

FIGURE II-6.—Map showing the potentiometric (water-level) surface in the sandstone aquifer in the overburden of the proposed Caballo mine.

The hydrostatic head in the overburden and coal was measured in observation wells at 24 sites (fig. II-6) on the leasehold. Table II-4, summarizing the water-level data taken in July 1977 at 10 pairs of observation wells, shows that the water-level elevations of the upper coal bed range from 32 to 80 feet below (average 50 feet) the water-level elevations of the overburden.

TABLE II-4.--Comparison of water levels of July 1977 in observation wells tapping overburden and coal

[Data supplied by applicant. Data are in feet]

Well site	Coal potentiometric water elevation	Overburden potentiometric water elevation	Difference between coal and overburden water levels
CA-304---------	4,452	4,486	34
CA-305---------	4,457	4,494	37
CA-306---------	4,450	4,482	32
CA-317---------	[1]4,664	4,700	36
CA-319---------	[1]4,519	4,593	74
CA-320---------	4,561	4,585	24
CA-321---------	4,464	4,544	80
CA-322---------	4,455	4,503	48
CA-323---------	4,484	4,554	70
CA-324---------	4,460	4,523	63

[1]Two coal beds are present. Figures taken from upper coal bed.

d. FORT UNION FORMATION

The coal beds of the Fort Union Formation, including the coal to be mined, are saturated and form artesian aquifers that are widely used for stock and domestic water supplies. However, the artesian pressure is insufficient to cause wells to flow. Three ground-water test wells (fig. II-6) were drilled by the applicant. Well CA-176 was dry, but wells CA-177 and CA-175 produced 100 gallons in 18 minutes, and 22 minutes, respectively, indicating a low yield.

Permeability of the coal aquifers probably ranges widely because fractures largely control ground-water movement in the coal.

Sandstones and coals below the coal to be mined in the Fort Union Formation commonly yield water at rates exceeding 10 gallons per minute. A thick section of water-saturated sediments of the Fort Union Formation present south of the coal outcrop line (figs. II-4 and II-6) is probably more permeable than the shale-sandstone sequence of the overburden. The water level in these sediments is only a few feet below the surface.

e. AQUIFERS BELOW THE FORT UNION FORMATION

Although aquifers are present in the strata below the Fort Union Formation, none of the wells in or immediately adjacent to the mine tap these aquifers.

f. QUALITY OF GROUND WATER

The chemical quality of ground waters in and near the mine have not been studied in enough detail to evaluate the variation in water quality and the significance of the variation. In adjacent parts of the Eastern Powder River Basin, variations in the quality of water in the coal aquifer indicate that the total dissolved content of water decreases, probably as a result of sulfate reduction, as the water moves through the coal aquifer. The exchange of sodium ions for calcium ions is also indicated.

King's (1975) map showing Campbell County gives the quality of ground water using samples collected and analyzed only for specific conductance. An interpretation of that map indicates that ground water within the mine property is marginal for domestic use. Northwest and west of the mine, the ground water is more highly mineralized and ranges from undesirable to unsuitable for domestic use.

Chemical analysis of water from wells CA-306 and PT-0-6 (observation wells in Tisdale Creek channel sands), the Caballo dewatering well (CDW, in clinker), and CA-334 (in overburden), are summarized in table II-5. Table II-6 shows the chemical quality of water sampled from wells in the overburden and coal aquifers. These tables give a fair general description of the water although specific data are inconsistent and unreliable.

2. SURFACE WATER

The proposed Caballo minesite is drained by ephemeral streams that flow to Caballo Creek, which empties into the Belle Fourche River. Tisdale Creek and two of its tributaries, Gold Mine Draw and North Tisdale Creek, originate north of the leasehold and drain southward across it to Caballo Creek (fig. II-1). Tisdale Creek, North Tisdale Creek, and Gold Mine Draw are, respectively, 1.5, 1.5, and 1.7 miles long within the leasehold, and their average gradients are, respectively, 50, 60, and 75 feet per mile. Minor tributaries within the leasehold have average gradients as great as 160 feet per mile.

Most runoff and streamflow occurs during May, June, and July as a result of snow melt and convective storms. Some of the smaller streams do not flow for a year or more, but when flows occur, it is often as a flood. Total runoff amounts are generally small due to the short duration and infrequent nature of the flood flows.

Within the leasehold, about 50 stock ponds have been impounded along drainages. The larger ponds contain water during most of the year. Ground water seeps into potholes excavated in the streambeds. These storages may reduce the yield somewhat but will have little effect on the larger floods.

TABLE II-5.--Water quality analyses for wells in alluvium, clinker, and overburden, Caballo mine

[Data, supplied by applicant, are in milligrams per liter unless otherwise indicated. ND, not detected at level shown in parentheses]

	Well sampled and sample dates				
	Caballo dewatering well			CA-306/PT-0-6	CA-334
Type of analysis	(5/5/77)	(6/7/77)	(7/5/77)	(8/2/77)	(6/23/77)
Sodium	106	77	93	237	16
Potassium	24	24	23	------	20
Calcium	290	187	266	84	719
Magnesium	0	65	37	38	101
Sulfate	660	640	750	4	1,950
Chloride	12	12	12	8	22
Carbonate	0	0	0		0
Bicarbonate	342	305	305	866	256
Total dissolved solids	1,260	1,155	1,331	802	2,954
Kjeldahl nitrogen	.16	------	------	------	.10
Phosphate	ND (.03)	------	------	------	ND (.01)
pH	8	7.6	7.6	8.4	7.2
Nitrate	ND (.02)	------	------	------	ND (.02)
Nitrate	.85	------	------	------	.80
Specific conductance 68°F, μmhos	1,425	1,425	1,425	------	2,950
Specific resistivity 68°F, ohm-meter	------	7.0	6.8	------	
Total alkalinity as $CaCO_3$	281	------	------	------	210
Dissolved Iron	.05	------	------	------	
Total hardness as $CaCO_3$	724	734	816	327	2,209
Total suspended solids	.4	.8	1.6	4.0	2
Total volatile solids	------	149	133	99	260
Turbidity (JTU's)[1]	------	ND (1)	ND (1)	11	7
Aluminium	.07	------	------	------	ND (.05)
Arsenic	ND (.01)	------	------	------	ND (.01)
Boron	ND (.02)	------	------	------	.28
Beryllium	ND (.005)	------	------	------	ND (.05)
Cadmium	ND (.002)	------	------	------	ND (.002)
Chromium	ND (.01)	------	------	------	ND (.01)
Copper	.01	------	------	------	ND (.01)
Flouride	.57	------	------	------	.14
Iron	.12	------	------	------	.04
Lead	ND (.05)	------	------	------	ND (.05)
Lithium	.03	------	------	------	.11
Manganese	.01	------	------	------	.25
Mercury	ND (.001)	------	------	------	ND (.001)
Molybednum	ND (.05)	------	------	------	ND (.05)
Nickel	ND (.04)	------	------	------	ND (.04)
Selenium	ND (.01)	------	------	------	ND (.01)
Silica	10.1	13.2	12.1	9.4	6.2
Zinc	.05	------	------	------	.14

[1]Jackson turbidity units.

TABLE II-6.--Water quality analyses for wells in coal and overburden, Caballo mine

[Data supplied by applicant]

	Sample and section location					
	CA-175 (sec. 11)	CA-175[1] (sec. 11)	CA-175 (sec. 11)	M. Clarke Ranch[1] (sec. 12)	Zapla Ranch[1] (sec. 22)	CA-177[1] (sec. 22)
Depth of well (ft)	97	226	148	170	255	280
Water production (gal/min)	3	5	3	6	--	5
Type of strata (producing from coal seam or overburden)	([2])	([3])	([2])	([3])	([3])	([3])
Chemical analyses (mg/L):						
Calcium	290	213	197	61	59	80
Magnesium	178	104	117	16	77	7.3
Sodium (by flame)	125	180	84	300	310	110
Carbonate	12	18	24	0.1	24	24
Bicarbonate	213	250	134	1,110	1,070	675
Chloride	10	21	19	9.6	11	12
Sulfate	1,590	1,020	935	<4.0	<4.0	42
Silicon dioxide	22	9	5	7.7	7.5	12
Hardness, as $CaCO_3$	1,460	960	970	220	225	230
Total solids	2,330	2,990	1,740	870	870	1,165
Total volatile solids	730	215	540	540	320	410
Total suspended solids	150	410	245	18	23	425
pH	7.8	7.8	8.0	7.3	7.7	7.8
Turbidity (JTU's)[4]	51	456	89	11	7	218
Specific conductance (μmhos/cm)	2,450	2,100	1,750	1,360	1,500	1,140

[1]Water quality sample from coal contaminated by water from overlying Wasatch Formation.

[2]Overburden.

[3]Coal.

[4]Jackson turbidity units.

Streamflow was recorded for lower Gold Mine Draw (Stream gage site No. 1 near southeast exit from property) from March 24 to July 21, 1977; for upper Gold Mine Draw (stream gage site No. 3 near the northern entrance to property) from March 24 until April 22, 1977; and in lower Tisdale Creek (site No. 2) from April 6 to 10, 1977. Streamflow was not recorded in upper Tisdale Creek (site No. 4) during the spring or summer of 1977.

The mean annual discharge and the discharge of the 50-year flow were estimated using a method described in Hodson, Pearl, and Druse (1973). The discharge estimates given in table II-7 are based on very little data and must be considered very approximate. They are intended only to show the probable magnitude. These estimates far exceed any streamflow measured to date.

TABLE II-7.--Estimated stream discharge values

[Data supplied by applicant]

Stream	Drainage area[1]	Mean annual discharge[2] [3]	50-year flood[2]
Tisdale Creek (entire drainage)----	43.8	2.0	2,400
Tisdale Creek----------	23.9	1.4	1,600
North Tisdale Creek----	8.8	.8	900
Gold Mine Draw---------	11.1	.9	1,100

[1]Square miles (mi^2).
[2]Cubic feet per second (ft^3/s).
[3]Based on method by Lowham, 1976.

Water samples were collected from lower Gold Mine Draw at the same time streamflows were measured. Analyses of selected samples that indicate general water quality at low flow are given in table II-8. Four water-quality samples taken from Caballo and Tisdale Creeks indicate that the water is acceptable for stock watering but not for domestic consumption. The concentration of sediments in the streams of the area increases as flow increases, whereas the concentration of dissolved chemical constituents decreases. Annual sediment yields estimated for the mine (fig. II-7) show little evidence of excessive erosion within the proposed mine area.

There are adjudicated water rights for 51.91 acre-feet for irrigation from Tisdale Creek and its tributaries (table II-9). There are 0.87 acre-feet from the South Fork of Tisdale Creek and 0.94 acre-feet from Don Draw, a tributary to Gold Mine Draw for stock use (State Board of Control, 1972).

E. AIR QUALITY

The proposed Caballo mine is in Powder River Basin subregion (11) of the State of Wyoming and has been designated by the Environmental Protection Agency

TABLE II-8.--Water quality analyses of samples collected from stream gaging site No. 1, lower Gold Mine Draw

[Data are in milligrams per liter except as indicated]

Parameter	Date sampled												
	4/12/77	4/21/77	4/26/77	4/28/77	5/3/77	5/10/77	5/13/77	5/24/77	6/2/77	6/9/77	6/16/77	6/23/77	7/1/77
Gal/min[1]	---	96	114	86	37	---	68	61	25	14	24	24	---
SGR[2]	---	.30	.28	.28	.28	---	.33	.34	.28	.28	.28	.28	---
Sodium	84	---	---	---	---	---	---	---	80	72	---	---	106
Potassium	13	---	---	---	---	---	---	---	23	19	---	---	20
Calcium	149	---	---	---	---	---	---	---	341	238	---	---	294
Magnesium	45	---	---	---	---	---	---	---	62	104	---	---	101
Sulfate	584	---	---	---	---	---	---	---	900	800	---	---	950
Chloride	6	---	---	---	---	---	---	---	10	50	---	---	12
Carbonate	0	---	---	---	---	---	---	---	0	0	---	---	0
Bicarbonate	171	---	---	---	---	---	---	---	439	366	---	---	488
Total dissolved solids	965	---	1,782	---	---	1,820	---	1,704	1,632	1,463	1,591	1,719	1,723
pH	7.9	---	---	---	---	7.7	---	---	8	8	---	7.9	7.9
Specific resistance 68°F, ohm-meters	8.9	---	---	---	---	---	---	---	5	5.7	---	---	5.2
Specific conductance 68°F, μmhos	1,125	---	---	---	---	---	---	---	2,000	1,750	---	---	1,925
Silica	7.5	---	---	---	---	---	---	---	10.2	6.8	---	---	9.8
Total hardness as $CaCO_3$	557	---	---	---	---	---	---	---	1,106	1,022	---	---	1,149
Turbidity, JTU's[3]	7	---	---	---	---	---	---	---	2	8	---	---	4
Total suspended solids	12.7	---	1.2	---	---	2.8	---	6	2.8	4	9.6	2.8	2.8
Total volatile solids	51	---	64	---	---	123	---	131	257	159	118	213	220

[1]Gallons per minute.
[2]Staff gage reading, in feet.
[3]Jackson turbidity units.

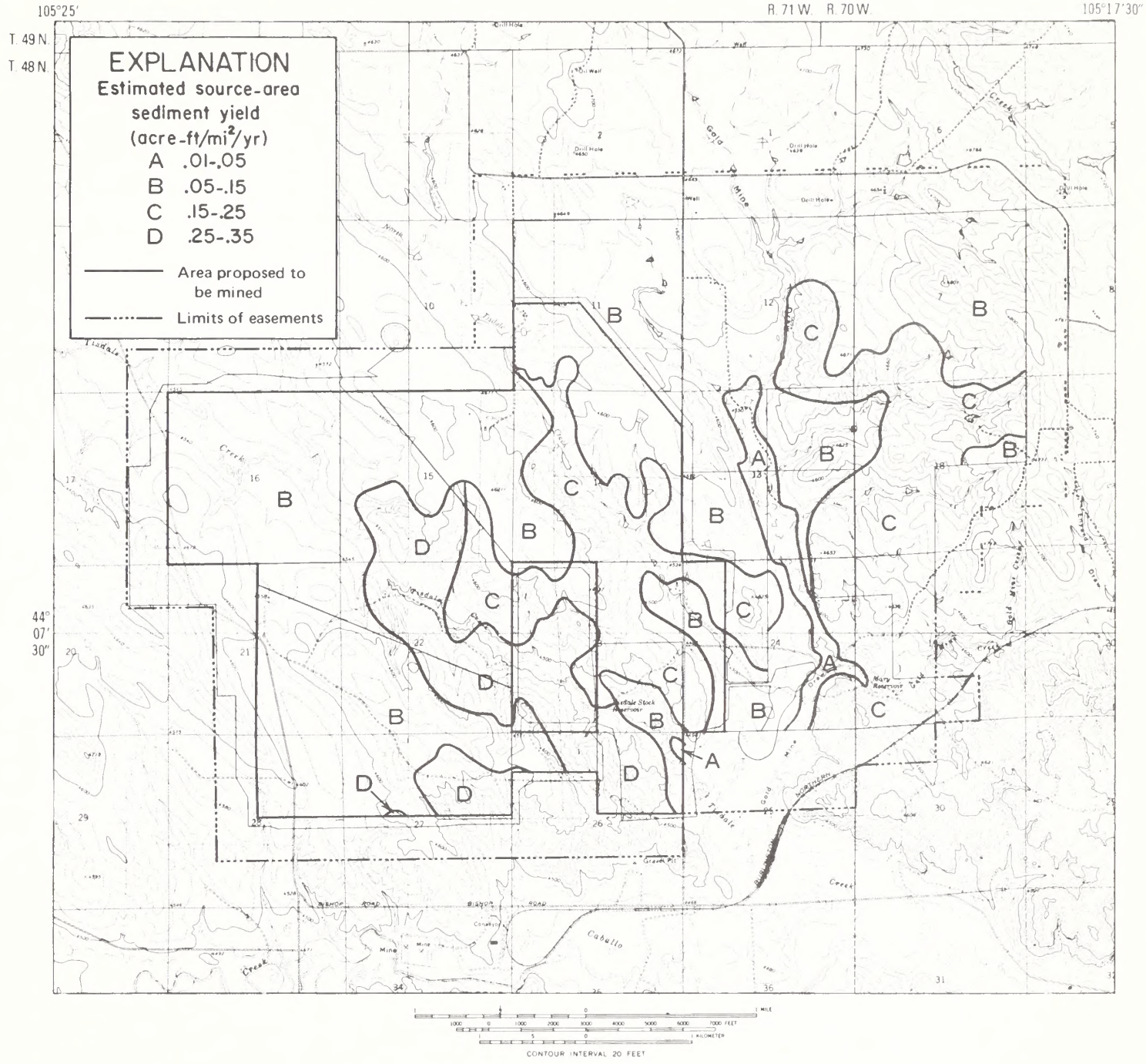

FIGURE II-7 —Map showing the estimated source-area sediment yield for the proposed Caballo mine. (Boundaries are defined on map 1)

TABLE II-9.--Surface water rights in or near the Caballo mine

[Data furnished by applicant]

Permit applications to appropriate surface water within or adjacent to the Caballo mine

Applicant	Facility	Location				Source	Capacity	Acreage irrigated	Date filed
		Section	T.	N., R.	W.				
James H. Cassidy	Cassidy No. 1	NW1/4NE1/4	25	48	71	Gold Mine Gulch	0.30 cfs	27.0	12/12/73
James H. Cassidy	Cassidy No. 1	SE1/4NW1/4	25	48	71	Tisdale Creek	0.70 cfs	49.3	12/12/73
James H. Cassidy	P.J. Stock Res.	NW1/4SW1/4	24	48	71	North Tisdale Creek	1.85 ac-ft		10/18/73

Appropriation certificates for water within or adjacent to the Caballo mine

Appropriator	Facility	Location				Source	Capacity	Acreage irrigated	Date filed
		Section	T.	N., R.	W.				
T.W. and Herma L. Czapla	Gold Mine Dike Spreader System	SW1/4NE1/4	13	48	71	Blue Draw	0.07 cfs	2.0	2/6/74
		NE1/4SW1/4	13	48	71			1.0	
		NW1/4SE1/4	13	48	71			2.0	
T.W. and Herma L. Czapla	Gold Mine Dike Spreader System	NE1/4NE1/4	13	48	71	Gold Mine Gulch	0.57 cfs	10.0	2/6/74
		NE1/4SW1/4	13	48	71			13.0	
		SE1/4NW1/4	13	48	71			12.0	
		NE1/4SW1/4	13	48	71			15.0	

Permit applications to construct stock-water reservoirs within or adjacent to the Caballo mine

Applicant	Stock reservoir	Location				Source	Capacity	Date filed
		Section	T.	N., R.	W.			
C.C. Greer	Truman	SE1/4SE1/4	12	48	71	Gold Mine Gulch	66.45 ac-ft	9/27/54
R.A. Clark	Lower Red	SE1/4SW1/4	18	48	70	Red Draw	2.03 ac-ft	11/23/59
T.W. Czapla	Cottonwood	NE1/4SE1/4	11	48	71	Tree Creek	49.26 ac-ft	7/24/59
L.D. Chambers	Mary	NW1/4SW1/4	19	48	70	Gold Mine Creek	4.13 ac-ft	1/22/60
T.W. Czapla	Spear Million	SE1/4NE1/4	13	48	71	Blue Draw	11.72 ac-ft	1/24/63
Melvin D. Clark	Additional	SE1/4NE1/4	19	48	70	Additional Draw	3.60 ac-ft	9/30/64
Melvin D. Clark	Coal Mine	NW1/4SE1/4	19	48	70	Coal Mine Draw	0.77 ac-ft	9/13/66
Melvin D. Clark	Gold Mine	NW1/4NE1/4	7	48	70	Gold Mine Gulch	1.65 ac-ft	9/13/66
T.W. and Herma Czapla	Sandhills	NW1/4SW1/4	11	48	71	Czapla Draw	1.23 ac-ft	1/28/66
Melvin D. Clark	Blue	NE1/4NW1/4	18	48	70	Blue Draw	3.60 ac-ft	12/07/70

as an Air Quality Maintenance Area, with marginal air quality problems related to fugitive dust. Generally, air quality over the leasehold does not exceed air quality standards (FES 74-55, BLM, 1974, p. I-127 to I-136), but it will decline with industrialization in the surrounding region (FES 74-55, BLM, 1974, p. I-468). Recent air quality data are given in FES 79-17 (BLM, 1979, p. R2-11 to R2-16).

The climate is semiarid and is characterized by variable precipitation (U.S. Department of Commerce), abundant sunshine, low humidity, and moderate temperatures with large diurnal and annual ranges. The average annual precipitation is estimated to be 15 inches and the mean annual free-water evaporation is estimated to be 56 inches. The recent short-term pattern of precipitation (1970-1974) exhibits both fall and spring maxima rather than the single spring maximum shown by long-term records (1941-1970). The mean annual temperature at nearby Gillette is 45.4°F. The warmest month, July, has an average temperature of 71.9°F; the coldest month, January, has an average temperature of 21.9°F. The frost-free period averages 120 days.

The dominant winds in winter are from the west-northwest or northwest. During the summer, winds are nearly random with a slightly higher frequency of wind from the southeast or south-southeast. Average annual wind speeds range from 8 to 12 miles per hour (FES 74-55, BLM, 1974, p. I-127), but winds often exceed 40 miles per hour.

The continual winds and low-relief terrain tend to break up temperature inversions: on the average, inversions occur 15 times each year and last 2 days (FES 74-55, BLM, 1974, p. I-129).

Nine high-volume air sampling stations located near the leasehold (fig. II-8) indicate a range of 12 to 73 micrograms per cubic meter ($\mu g/m^3$) (Wyoming primary standard is 60 $\mu g/m^3$) (table II-10) for the geometric mean suspended particulate concentration. All stations are

TABLE II-10.--Regional suspended particulate concentrations in air

[Source: Pronghorn FES 79-13 (USGS, 1979). Data are in micrograms per cubic meter]

Station[1]	Period	Period-geometric mean concentration	Second highest concentration
Pronghorn---------	12/75-6/76	12	43
Cordero No. 1-----	1/76-12/76	15	[2]158
Cordero No. 2-----	1/76-12/76	34	[2]215
Cordero No. 3-----	1/76-12/76	14	[2]60
Caballo----------	6/30/76-11/20/76	27	47
Belle Ayr No. 1---	10/76-4/77	20	59
Belle Ayr No. 2---	10/76-4/77	73	265
Belle Ayr No. 3---	9/76-4/77	71	404
Belle Ayr No. 4---	9/76-4/77	28	128

[1]See figure II-10 for location of station.
[2]Maximum value (second highest value not available).

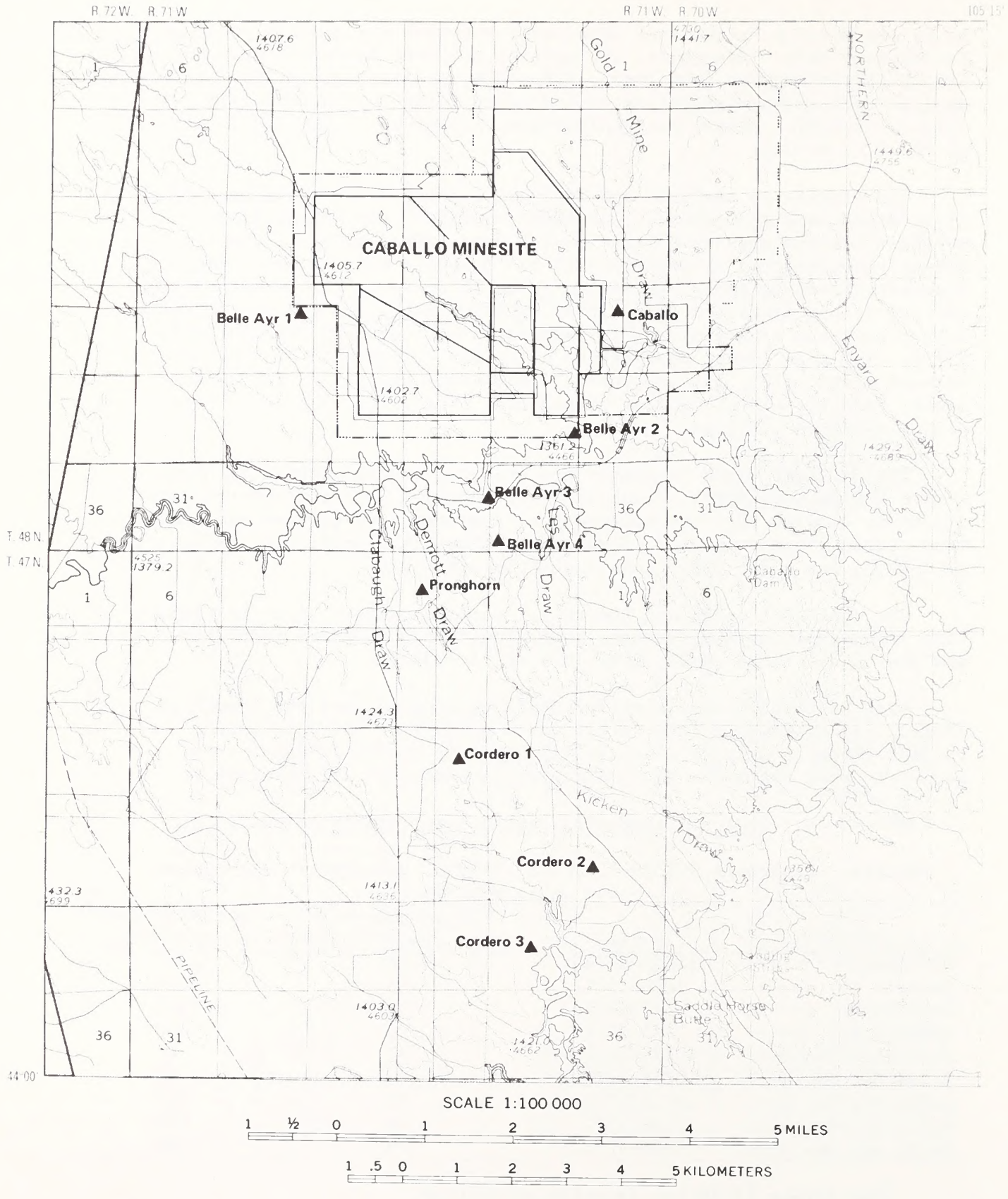

FIGURE II-8.—Map showing the locations of the air sampling stations near the proposed Caballo mine. (Boundaries are defined on map 1)

operated by mining companies. Excluding sites 2 and 3 because of their proximity to the Belle Ayr South mine, the background level is between 12 and 34 $\mu g/m^3$ with an occasional 24-hour value exceeding the Wyoming and Federal secondary standard of 150 $\mu g/m^3$.

Onsite data have not been collected for sulfur dioxide, nitrogen oxides, and hydrocarbons. However, data for Gillette indicate an annual average concentration of 14 $\mu g/m^3$ for sulfur dioxide and 3 $\mu g/m^3$ for nitrogen dioxide (EPA, 1975). These concentrations are less than the Wyoming Standards, which are as strict or stricter than the Federal Standards of 60 $\mu g/m^3$ and 100 $\mu g/m^3$, respectively. The absence of a significant source for these pollutants indicates that their ambient concentrations are expected to be low at the leasehold.

F. VEGETATION

Vegetation on the proposed mine, primarily the short-grass plains type, is shown on the vegetation map, prepared for the applicant by the Plant Science Division, University of Wyoming, during 1974, 1975, and 1976 (map 4, in pocket). Vegetation is primarily the short-grass plains type. Bluegrama, western wheatgrass, needle-and-thread, and prairie junegrass are the dominant grass species. Big sagebrush density ranges from light to heavy over most of the leasehold. No threatened or endangered species of vegetation were reported.

The agricultural areas on the proposed mine are predominantly dryland hay fields and improved pasture, with crested wheatgrass as the primary crop. There are some areas where alfalfa, wheat, and corn are grown. Abandoned fields are in various successional stages, with dominants including crested wheatgrass, cheatgrass, and bluegrasses.

G. WILDLIFE

Wildlife observation and census data used in the statement were collected on the leasehold for the applicant by the University of Wyoming.

Although not observed on the Caballo leasehold, endangered species that are known to occur in the region are: black-footed ferret, southern bald eagle, and peregrine falcon. Periodic visits from any or all of these rare species are possible. Detailed lists of species known to be present in the Powder River Basin are given in FES 79-17, April 1979, tables R2-8 through R2-19).

Pronghorn antelope are the most common big game animals on the Caballo leasehold; antelope have been observed feeding on the dry-land hayfields during the summer and fall, and the brush habitat (sagebrush-rabbitbrush) is considered essential for winter survival. Estimates of the antelope population by the Wyoming Game and Fish Department indicate that one section supports between 15 and 20 antelope. More recent work by the University of Wyoming in 1976 indicates a density of 10 antelope per section.

Mule deer inhabit the steep, wooded breaks in the eastern part of the leasehold, but they probably do not frequent the Tisdale-Caballo Creek drainage area. Only occasional mule deer sightings were made during the University of Wyoming's field census.

Predators that have been observed on the leasehold include coyote, red fox, badger, raccoon, weasel, and striped skunk. Coyote and red fox may be found, at least on a transient or seasonal basis. Badger and skunk are year-round residents. Raccoons probably inhabit areas near check dams and cattle ponds. No population estimates for these animals are available.

Cottontail rabbit, black-tailed jackrabbit, and white-tailed jackrabbit are common. The cottontail prefers habitats in drainage courses or places of broken topography in association with shrubs, forbs, and grasses; the jackrabbit prefers open grassland with scattered shrubs. Figures currently available indicate species densities of slightly less than one animal per section for both the cottontail and white-tailed jackrabbits.

Many different kinds of rodents are present. Field observations have confirmed the presence of deer mice, harvest mice, thirteenlined ground squirrels, grasshopper mice, least chipmunks, pocket mice, northern pocket gophers, and meadow jumping mice. The Ord's kangaroo rat, meadow vole, porcupine, and others are also expected.

Three summers of small mammal trapping studies have been done at the Caballo leasehold. These studies indicate that the deer mouse is most abundant, followed by the thirteen-lined ground squirrel and the northern grasshopper mouse, in order of decreasing abundance.

Very few sage grouse have been observed. Initial census data indicate a density of slightly less than one sage grouse per section. Wyoming Game and Fish Department census data indicate large populations and strutting grounds on the Amax leasehold immediately to the south. Specific strutting grounds have not been identified on the Caballo leasehold.

Sharp-tail grouse are much less common. No density information is available and no dancing grounds are known on the leasehold. Populations of Hungarian partridge are very scattered and of minimal significance. Numerous mourning doves make use of the grain crops and waterholes during spring, summer, and fall.

Waterfowl and shore bird habitat is limited to streams and stock ponds. There is approximately one nesting pair per waterhole. Common species include the mallard, gadwall, green-winged teal, blue-winged teal pintail, American widgeon, and killdeer.

Raptorial species observed on the leasehold include the golden eagle, Swainson's hawk, ferruginous hawk, marsh hawk, red-tailed hawk, rough-legged hawk, and prairie falcon. Additional species are expected to use the area at least seasonally. Most of these species nest on or near the leasehold

and do at least part of their foraging there. No nests of endangered species were found on the leasehold during environmental surveys. These raptors prey primarily on various rodents, cottontails, and jackrabbits. Small birds and large insects such as grasshoppers may be consumed by some raptors during periods of availability.

Species of songbirds common in the vicinity include the vesper sparrow, lark bunting, western meadowlark, black-billed magpie, and redwing blackbird. Data from a recent census show an average density of 2.4 songbirds per acre. Food and nesting habits, territorial behavior, and vegetative characteristics vary enough to support a considerable diversity of birds.

Four species of reptiles have been observed, including the blue racer, prairie rattlesnake, plains garter snake, and short-horned lizard.

H. LAND USE

The Caballo leasehold is now, as in the past, used as rangeland for cattle and subordinately as hayland and pasture. Wild hay and seeded crested wheatgrass are cut for winter feed, and the cut areas are used for pasture. No potential prime farmlands have been identified on the Caballo leasehold.

In 1973 and 1974, Carter Oil Company purchased the ranchland on the leasehold and then leased it to the prior owners for continued ranching.

No county zoning applies to the leasehold.

I. SOCIOECONOMICS

The Caballo mine is one of the many coal developments (fig. I-1) that have affected, or will affect, social and economic conditions in the Gillette and Campbell County area.

The recent rapid increase in population, with its social and economic ramifications, has been thoroughly documented. A description of the existing socioeconomic conditions in Sheridan, Johnson, Natrona, Campbell, Converse, Crook, Weston, and Niobrara Counties of the Powder River Basin is given in FES 79-17, April 1979. That study is being updated by the Bureau of Land Management with publication scheduled for early 1979. Current socioeconomic information specific to Campbell County is contained in the following reports: Anderson, Sohocki, and Marcus (1978), Doran, Duff, and Gilmore (1974), Gladstone Associates (1976), Hayen and Watts (1975), Moore and others (1976 and 1977), Moore and Loomis (1977), and USGS (1979a and 1979b).

J. TRANSPORTATION AND UTILITIES SYSTEMS

1. ROADS

U.S. 14-16 runs east-west about 10 miles north of the proposed mine; State Highway 59 runs north-south about 3 miles west of the proposed mine; and Interstate 90 is north of U.S. 14-16 and generally parallel to it (fig. I-1). The T7-Hilight Road, a graded clinker road, extends southeast from Highway 59 and crosses the southwestern part of the proposed mine. Bishop Road (fig. II-1), a graded clinker road, runs east-west about 0.5 miles south of the proposed mine. A few other minor roads cross the proposed mine.

2. RAILROADS

A line of the Burlington Northern Railroad passes through Gillette parallel to U.S. 14-16 (fig. I-1). The line carries an average of 9 trains per day; 5 are unit coal trains (FES 79-17, April 1979). The Capacity of the line is rated between 40 to 65 trains per day.

In January 1976, the Interstate Commerce Commission granted permission to Burlington Northern and Chicago and Northwestern Transportation Company to construct a line between Gillette and Douglas, Wyoming. This spur has been completed as far south as the Black Thunder mine. When completed in mid-1980, this line will allow trains from the Gillette area to go south through Cheyenne, Wyoming, and Denver, Colorado, thus increasing the capacity of Burlington Northern to transport coal.

3. POWERLINES

The Wyodak generating plant near Gillette has a capacity of 27.5 MW. A 330-MW plant, built near the old plant, began operation in June 1978. Coal for the plant comes from the Wyodak mine. A 69-kV powerline with several distribution lines runs north-south, crossing a portion of the Caballo leasehold.

K. RECREATION

Gillette is considered a big-game hunting center. Other outdoor recreation potentials are negligible, however, and the area is little used for recreation because the land surface is privately owned. The area proposed for mining has potential for recreation such as hunting, sightseeing, and off-road vehicle use.

L. CULTURAL RESOURCES

An archeological field crew from the University of Wyoming/Archeological Division of the Wyoming Recreation Commission, sponsored by the Carter Mining Company, completed an inventory of prehistoric sites on the

leasehold during the summer of 1975. The inventory reported three sites of archeological value--University of Wyoming site numbers 48 CA 23, 24, and 25. All have been fully recorded.

Sites 48 CA 23 and 24 were stone circles or tipi ring sites, site 48 CA 25 was a hearth and two artificial arrangements of stone. Additional isolated artifacts and flaked material were reported throughout the leasehold.

Based upon current information, no significant historic values are present on the Caballo leasehold. The Federal Register has been reviewed, and the Wyoming State Historic Preservation Officer has been consulted. None of the cultural resources identified on the leasehold is listed on or eligible for nomination to the National Register of Historic Places.

M. VISUAL RESOURCES

Visual resource inventories have been conducted from two travel routes, Highway 59 and T7-Hilight Road (fig. I-1), near the Caballo mine.

The BLM classification in scenic quality for this area is C, lacking in dominant scenic factors such as variation in landform, color, and vegetation, and including man-made intrusions such as roads, ranch buildings, railroads, and coal mines.

The Caballo leasehold falls within two BLM visual management classes, III and IV, allowing some subordinate changes and some modification in the landscape.

CHAPTER III

PROBABLE IMPACTS OF THE PROPOSED ACTION

This chapter discusses the probable impacts of approval by the Secretary of the Interior of the mining and reclamation plan submitted by the Carter Mining Company for the Caballo mine if mining takes place on about 4,300 acres, with a total of about 6,700 acres being disturbed, as proposed and as governed by existing legal requirements (chapter I). As indicated in chapter I, however, the plan has not been fully evaluated to determine compliance with 30 CFR 700. When a revised plan is submitted to the State and OSM, the status of the impacts will be reevaluated.

Throughout this chapter, impacts are ranked according to their significance, as measured by the degree to which the impacts would ultimately interfere with or benefit the anticipated uses of each resource. Thus, adverse impacts of great significance to water resources would imply that mining would cause severe conflicts with anticipated water uses.

A. TOPOGRAPHY

The impact of mining on the topography will be of relatively little significance, in that changes in the topography are not expected to significantly interfere with the anticipated postmining land use for cattle grazing. However, the loss of the existing topographic diversity will lessen the suitability for wildlife habitat.

Mining and reclamation will create a manmade, gently rolling upland (fig. I-4) that will be a lower and subdued generalization of the present topography (fig. II-1). Steep slopes and ledges will be eliminated on the mined area; postmining slopes will be less than 5:1, unless exceptions are granted by the State of Wyoming.

Depending on the bulking factor assumed (10-20 percent), it is estimated that the minesite, about 4,300 acres, will be lowered an average of 50 to 60 feet. Locally, the surface will be lowered as much as 100 feet or raised as much as 60 feet. The lowering will be greatest in the southern part of the leasehold, where the overburden is thinnest. Compaction of the replaced spoils will cause an unknown amount of gradual settling (probably no more than a few feet during a few decades after reclamation). Settling will be greatest along the western boundary of the leasehold, where the replaced spoils will be thickest. The Caballo mine will contribute to development of a subtle north-south regional depression about 5 miles wide in which the land surface will be generally lowered by mining and reclamation in the region by the various mining companies that currently own leases (fig. I-1).

B. GEOLOGY AND MINERAL RESOURCES

Impacts to the geology will be of little significance, in that the formations and characteristics to be destroyed represent only a small

portion of the geologic resources, and recovery of other mineral resources will probably not be hampered.

1. GEOLOGIC RELATIONSHIPS

Up to 75 feet of coal will be removed, and up to 275 feet of overburden will be removed and replaced. Geologic units and relationships above the base of the coal will be lost; beneath the coal they will be unaffected by mining.

The overburden will be replaced in roughly its original stratigraphic sequence, but removal and replacement will destroy the original stratification sequence of beds, geologic structure, and physical characteristics. Bulking (increase in volume) of the overburden due to disaggregation of parent rocks by mining, will reduce its density 10 to 20 percent.

2. PETROLEUM AND NATURAL GAS

No attempts to initiate secondary recovery from abandoned wells or to explore for petroleum or gas are anticipated during mining and reclamation.

3. CLINKER AND OTHER CONSTRUCTION MATERIALS

An unknown, but regionally insignificant, amount of clinker, sand, and gravel will be used in construction.

4. PALEONTOLOGY

Impacts to paleontological resources will consist of losses of plant and invertebrate and vertebrate fossils for scientific research, public education (interpretative programs), and amateur collectors. The losses would result from destruction, disturbance or removal of fossil materials as a result of coal mining activities, unauthorized collection, and vandalism. Positive impact of development would be the exposure of fossil materials for scientific examination and collection which otherwise may never occur except as a result of overburden clearance, exposure of rock strata, and mineral excavation.

Fossils of Eocene and Paleocene age in the Wasatch and Fort Union Formations will be impacted to variable degrees. An undetermined number of uninventoried exposed and unexposed localities will be disrupted. The affected formations are geologically well known and geographically extensive.

All exposed fossiliferous formations within the region could also be affected by increased fossil collecting and vandalism as a result of increased regional population. The extent of this impact cannot be presently assessed due to a general lack of specific data on such activities.

C. SOILS

Impacts on soils will be of moderate significance, in that productivity potential will be reduced on about 6,700 acres, with corresponding impacts on revegetation (see "Vegetation," this chapter) and land use after reclamation, but the soils will support post-mining use of cattle grazing.

On 4,300 acres soils will be progressively stripped and subsequently redistributed. The existing 30 types of natural soils (map 3) with their individual physical, chemical, and biological characteristics and related plant/animal ecosystems would be destroyed and replaced by new soil mediums that would be less diverse in number, character, and extent. Natural soil-forming processes would gradually establish new stabilized soil types probably with different characteristics than existing soils.

Stockpiled soils may become biologically sterile; although this will not ultimately affect their use as a medium for growing plants, it will slow the soil-forming processes until the soils are biologically reinoculated naturally from undisturbed areas.

Soil will be eroded from the leasehold when the stabilizing vegetative cover is removed and the soil and overburden are excavated. If reclamation requirements are met, erosion will probably be minimized.

Some wind and water erosion will occur along access and haul roads and in other areas where the plant cover is adversely affected by mining operations. The sediment generated by this erosion should remain largely within the leasehold, however, and would be reduced to premining levels on completion of reclamation. Increased soil erosion, on the steeper reclaimed slopes and in areas where soil permeability is reduced by compaction, should be approximately offset by reduced erosion on adjacent areas, where slopes would be reduced as a result of the proposed operations. The net long-term change in sediment yield downstream from the mine should be very minor.

The controlled release of sediment-free water from sedimentation ponds should reduce flow velocities and lessen erosion. By prolonging periods of flow, the controlled release should stimulate the growth of riparian vegetation downstream to the extent that little or no increased channel erosion is expected. Moreover, sedimentation ponds should significantly reduce peak discharges downstream, thereby temporarily reducing local scour during the period of mining.

Runoff from watering haul roads may increase the salinity in soils adjacent to the roads as a result of evaporation of the slightly saline water used for dust control. Any increease in salinity stress imposed on the vegetation, however, should be more than offset by the reduction in aridity stress as a result of the added moisture available for plant growth. The net impact on the plant cover would probably be more beneficial than adverse.

Mining operations may expose overburden materials that would hamper reclamation because of toxic constituents (trace elements and heavy metals). high alkalinity or salinity, unsuitable texture (too sandy or too fine-grained), or low cation-exchange capacity. Any such material would be buried at least 8 feet below the surface, as required by the Surface Mine Control and Reclamation Act. Experience in the eastern Powder River Basin shows that toxic constituents in overburden materials are normally geochemically stable (probably because of the high carbonaceous content of the rocks) and not readily leached by ground water percolating through reclaimed spoils. Therefore, no contamination of any water supplies in the area is expected.

D. WATER RESOURCES

Impacts on water resources will ultimately be of moderate significance because they will have little effect on anticipated water uses, except stock watering, both during and after mining.

1. GROUND WATER

During mining, the water levels in wells tapping the overburden and coal aquifers within a radius of a few miles of active mining may be lowered a few feet. Data, supplied by the Water Resources Research Institute of the University of Wyoming, indicate that the maximum drawdown in wells on the adjacent Amax Belle Ayr South leasehold is 3 feet. Experience in similar terrain in Montana shows that drawdown does not extend beyond 2 miles from the minesite (F. N. Visher, oral communication, 1978). After reclamation and topographic restoration, ground-water levels in these aquifers will probably approximate premining levels. Mining will have little effect on the aquifers below the coal that is mined.

The lower part of the backfilled spoil will develop a zone of saturation after reclamation. The water yield to wells may or may not return to premining levels, but the resulting impact on water use in the area will be little because water supplies do not depend solely on the overburden and coal zones. Water can be obtained from beds of sandstone in the Fort Union Formation and deeper aquifers below the replaced spoil.

Changes in the quality of ground water cannot be predicted with certainty on the basis of existing data. However, postmining ground water will probably have a substantial increase in dissolved solids and therefore may not be suitable for livestock use, especially west-southwest of the leasehold, or down gradient. Data in Montana show an increase in amount of dissolved solids from 1.5 to 2 or more times the premining amount (F. N. Visher, oral commun., 1978). Recharge through, and subsequent leaching of, backfilled spoil at the minesite will probably slightly reduce ground-water quality, which has already been reduced by adjacent mines to the south.

2. SURFACE WATER

During mining the existing drainage system will be changed to a major degree through the construction of a system of diversion ditches and settling ponds designed to control runoff from undisturbed areas and from the mine (fig. I-2). About 20 of the approximately 50 existing stock ponds will be removed during mining. Replacement stock ponds are incorporated in the postmining drainage plans (fig. I-4). Because the slope of the drainages will be changed during reclamation to meet regulations, the number and size of ponds will depend on channel stability. If necessary, the ponds will be designed to stabilize the grade, which will be more costly. For short periods, erosion could increase greatly in stream reaches downstream from the settling ponds if water is suddenly released to reduce storage volume, to permit dredging, or for other purposes. The applicant has secured a National Pollutant Discharge Elimination System permit.

Although increased sediment loads due to periodic increase in runoff of water across unstable spoil and dredge sediment will be controlled by ponds and ditches during mining, some sedimentation may occur downstream from the leasehold, decreasing channel capacity, thus resulting in flooding during periods of high flow.

As part of the reclamation, the restored drainage system, including new stock ponds, will be established in accordance with the restored topography (fig. I-4). The geometry, stability, and efficacy of this new drainage system and its ability to support anticipated water uses cannot be predicted on the basis of available information.

E. AIR QUALITY

The coal mines in the eastern Powder River basin, including Caballo, are expected to be major contributors of particulate emissions. (See table III-1.) Fugitive dust emissions will result from construction; blasting; coal and overburden loading and dumping; haul road and access road traffic; and wind erosion of exposed areas. Because only small amounts of hydrocarbon, carbon monoxide, and oxides of nitrogen are released from vehicles, machinery, and other combustion sources within coal mines, their effects on surrounding air quality are expected to be insignificant (FES, Northwest Colorado Coal, BLM, June 1976).

"Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979) analyzes the anticipated impacts on air quality in the region. A computer model was used to estimate the emissions from the individual sources and to prepare maps showing ambient TSP concentrations in the region in 1980, 1985, and 1990. These data show that TSP emissions from the Caballo mine would be 606 tons/year in 1980, 1,598 tons/year in 1985, and 3,651 tons/year in 1990. Since the mine expects to be in full production by 1990, this last figure should be the maximum emission of TSP from Caballo.

TABLE III-1.--Estimated air pollution emissions[1] related to the proposed Caballo mine in tons per year

[Data supplied by applicant]

Activity	Particulates	SO_x	CO	HC	NO_x
		(tons per year)			
Onsite emissions:					
Mining					
Stripping----------	150	----	----	----	----
Revegetation---------	4	----	----	----	----
Soil erosion by wind----------	2	----	----	----	----
Mining, crushing, and handling of coal----------	720	----	----	----	----
Total mining----	860	----	----	----	----
Mining vehicles--------	24	52	440	70	720
Coal trains---------	1	2	5	4	15
Total onsite----	901	54	445	74	735
Offsite emissions:					
Coal trains----------	67	150	350	250	990
Population increase-----	376	442	2,210	663	1,061
Total offsite---	443	592	2,560	913	2,051
Total emissions for Carter Caballo mine----------	1,344	646	3,005	987	2,786
Total regional emissions without Carter Caballo mine----------	23,000	9,700	45,000	14,400	33,000
Total combined emissions (estimated for 1990)----	24,344	10,346	48,005	15,387	35,786

[1]Assumptions on p. III-7.

[1]Assumptions for table III-1:

These figures are based on an average coal production of 12 million tons per year produced by disturbing an average of 100 acres per year during 40 years of coal production.

1. Stripping: 1.5 tons of fugitive dust produced for each acre of land disturbed per year.

2. Vegetation: 0.08 tons of fugitive dust produced for each acre of land reclaimed for 5 years after reclamation occurs.

3. Soil erosion by wind: 0.02 tons of natural dust produced per acre of the leasehold per year.

4. Mining, crushing, and handling of coal: 60 tons of coal dust lost per million tons of coal mined and handled.

5. Onsite vehicle emissions: 50 pieces of equipment, operating 12 to 24 hours and consuming 11,000 gallons of diesel fuel per day; assumed shovel and truck fuel consumption rates and emission factors were determined by EPA (1972).

6. Onsite unit-train emissions: Spur-line loop with a track length of 3.7 miles, an assumed fuel consumption rate of 1,800 gallons of diesel fuel for each 1 million ton per mile delivered, and EPA emission factors for locomotives (EPA, 1972).

7. Offsite unit-train emissions: 1,200 unit trains per year carrying 12 million tons of coal over the production life of the mine, and emission rates assumed for each train in FES 79-17, April 1979.

8. Population-related emissions: Total full-production mine-related population increase of 2,650 people. (See EPA emission factors for population increases, EPA, 1973.)

The analysis in FES 79-17 shows that significant TSP concentrations would occur in the area encompassing Caballo, Belle Ayr, Pronghorn, Cordero, and Coal Creek mines. Annual TSP concentrations would be 30 micrograms per cubic meter ($\mu g/m^3$). This is only 6 $\mu g/m^3$ above present rural background concentrations. Annual concentrations would reach 35 $\mu g/m^3$ in the areas between closely adjacent mines. The increase in annual TSP concentrations would decline to 1 $\mu g/m^3$ 10 miles from the mines. The highest 24-hour TSP concentrations are expected to occur in Gillette. A 24-hour concentration of 119 $\mu g/m^3$ is predicted in 1985 and 136 $\mu g/m^3$ in 1990. It was shown that Wyoming's 24-hour TSP standard may be violated in downtown Gillette, but it is unlikely that the national primary standard of 260 $\mu g/m^3$ would be reached. The annual and 24-hour Wyoming air quality standards of 60 $\mu g/m^3$ and 150 $\mu g/m^3$ may be exceeded at the boundary of some of the existing mines. However, note that under EPA's prevention of significant air quality deterioration (PSD) regulations (43 CFR 118), TSP violations would not occur, since Best Available Control Technology (BACT) and Best Management Practices (BMP) would be applicable. It is estimated that Caballo mine will contribute less than 6 percent of the total emissions expected from coal development in the area by 1985.

F. VEGETATION

Impacts to vegetation will be of moderate significance because the vegetation reestablished on the approximately 6,700 acres disturbed by mining and facilities will support cattle grazing after mining. Wildlife habitat and browse, however, will not equal the quality of the present range, largely because the reestablishment of vegetative diversity (map 4) may take 40 years or more. Some specific soil-water-topographic conditions will not be replaced. Vegetative communities associated with and controlled by these conditions will not return.

During mining, lost vegetative production will represent a loss of gross income to three local ranchers. The loss in net income, however, will be considerably less, because cattle production costs are high.

There is little information on the effectiveness of reclamation in Campbell County because abandoned surface mines have not been studied, and modern reclamation techniques have only recently been applied. Short-term results at the Absaloka, Colstrip, and Decker mines in Montana and the Belle Ayr South and Dave Johnson mines in northeastern Wyoming indicate that a vegetative cover of grassland plants can be established in about 3 to 5 years. However, it will be perhaps 10 years before the success of reclamation at these mines can be meaningfully evaluated.

The long-term effectiveness of mining reclamation in Campbell County is quantitatively unknown, but qualitative information indicates that the reclamation can be expected to affect ecosystems for more than 40 years. Reclamation can be expected to support the existing land use--cattle grazing --in less than a decade, with a possible short-term increase in vegetative productivity.

G. WILDLIFE

Impacts to wildlife will probably be of little long-term significance; although approximately 100 antelope and 10 sage grouse will be progressively displaced during mining, they are but a small fraction of regional populations, and antelope are known to remain around mine areas. Many small mammals will be progressively destroyed and birds progressively displaced during mining, but both will reinhabit reclaimed areas at about present levels within a few years. With temporary loss of stock ponds, about 20 pairs of waterfowl will be displaced, and amphibians will be displaced or destroyed. Some reptiles will be displaced or destroyed. Because no endangered species of raptor nesting sites are known to occur on the leasehold, impacts on raptors are expected to be minimal. However, construction of powerlines could create an electrocution hazard to perching raptors.

The antelope on the minesite will probably be gradually displaced during mining to undisturbed native range on adjacent land. Some will return to range across the reclaimed areas, but most will probably remain on the undisturbed range for forage.

During mining, the population of sage grouse will probably be gradually reduced. Grouse will reinhabit the reclaimed areas as sage is re-established, probably within a few decades.

Impacts to predators will be relatively small: predators will be progressively displaced to undisturbed areas as their prey is displaced or destroyed, but within a decade most will probably return to reclaimed areas as their prey populations again increase.

No significant effects on endangered species or on Wyoming "rare" species are anticipated.

H. LAND USE

Impacts to land use will be of little significance, as anticipated land uses will not be appreciably hampered either during mining or after reclamation.

During mining, rangeland, hayland, and pasture will be removed from production at an average rate of 100 acres per year, with a maximum of about 2,000 acres, including mine plantsite, out of production at any one time.

I. SOCIOECONOMICS

The major socioeconomic impacts resulting from Federal approval of the proposed Caballo mine are those associated with the rapid increase in population and employment, the resulting increase and changed distribution in personal and regional income, and the demand for public goods

and services. Additional specific information is needed to accurately address these impacts. This will become possible as experience becomes available.

1. POPULATION

Table III-2 shows the total projected increase in population due to the Caballo mine. During the first decade of mining, the Caballo mine will add about 10 percent, or 2,650 persons, to the 24,000 population increase for Campbell County that is projected to occur between 1978 and 1985. By 1985 the population of Campbell County is expected to be about 49,000 (Anderson and others, 1978, p. 4); about 5 percent of the total Campbell County population will result from the Caballo mine.

TABLE III-2.--Estimated employment and population by year caused by the proposed Caballo mine between 1980 and 2018

[Data supplied by applicant]

Population category	Year			
	1980	1984	1986	1988-2018
Permanent mine employment-------	125	180	220	360
Mine construction employment[1]---	86	0	0	0
Other employment (secondary or non-base employment)[2]------	275	396	484	792
Total permanent employment generated by Caballo mine[3]	400	576	704	1,152
Total population increase[4]-	920	1,325	1,619	2,650

[1]Maximum number during year.

[2]Values based on economic multiplier relating mine employment (base) to secondary employment (non-base) developed by Gladstone Associates (1976). Values obtained by multiplying permanent mine employment by 2.2, i.e., for each new mining job (base), 2.2 non-basic or secondary jobs will result. Although secondary employment usually lags behind new base employment, Gladstone Associates (1976) found no lag in non-base employment. They attribute no measurable lag in non-base employment to increases in temporary construction employment.

[3]Values are the sum of permanent mine employment and other employment. Values do not include mine construction employment.

[4]Values obtained by multiplying total permanent employment by 2.3 persons per household.

2. SOCIAL CONDITIONS

Impacts on social conditions will be of major significance, especially during the first decade of mining, when the Caballo mine will contribute about 10 percent of the projected population increase in Campbell County. The mine will therefore make a correspondingly high contribution to socio--economic problems associated with boomtown growth and the continuing loss of small-town and rural values. If stable industries are established in the area when mining ends, those values will be permanently lost; if stable industries are not established, those values will probably return over several decades--but very possibly at the expense of an economic bust. Impacts associated with rapid growth will be most severe to current longtime residents of Gillette and Campbell County; newcomers will probably bring and retain more urban values and be less impacted, but boomtown conditions will lower the overall quality of life. Anomalously high rates of alcoholism, crime, divorce, and suicide are likely, and public services, notably health care, will lag behind needs (FES 79-17, April 1979).

3. ECONOMIC CONDITIONS

Assuming an average salary of $15,000 per year in year 1 and inflation adjustments of 5 percent per year, the payroll associated with permanent mine employment will increase from slightly more than $0.6 million in year 1 to about $8 million in year 10, when the mine's annual production reaches 12 million tons.

New tax revenues from increased wage expenditures, personal property taxes, and local purchases for mine construction and operation will benefit the regional economy. The State of Wyoming will receive 50 percent of the production royalties from the Federal leasehold--about $1.2 million annually at full production, to be spent on schools and public roads. Full production, however, is not anticipated until 1987, so that the supply of public goods and services to be financed from the increased tax base will lag behind the increasing need.

Most residents of the area will benefit, but some will face economic hardships. People on fixed income will lose buying power relative to the higher paid newcomers. Also, local businesses will have to compete with large national stores attracted to the area by expanding markets. Ranchers will have difficulty competing for land because of increasing land prices.

The following economic impacts are based on a study by the University of Denver Research Institute (DRI) (Moore and others, 1976): Although financial projections are highly sensitive to changes in assumptions, they suggest positive fiscal impact on the county schools, due primarily to the mine's startup date in relation to those of the other mines in the area; negative fiscal impact on Gillette and positive fiscal impact to Campbell County. The gain to the county will probably exceed the loss to the city, as the assessed value of coal increases above the present valuation of $2.30 per ton.

Gillette will not share directly in increased tax revenues, but it will incur most of the cost of providing public services for the population increase, which will be concentrated in the city.

The increase in tax revenue to Campbell County and the State will come mainly from three Wyoming mineral taxes:

1. The State coal excise tax (severance tax). The coal excise tax is currently 4 percent of the coal's assessed value; one-half of the revenue collected from this tax goes into the State's general fund, and the other half is put into a permanent fund for future use in mitigating impacts from coal development.

2. Coal impact tax. The impact tax is being used to create a $120 million fund to make loans and grants to governments in the impacted areas. The tax rate will increase annually until the maximum rate of 2 percent is reached around 1979.

3. Property tax assessed by Campbell county. The total local property tax for the county, the school district, and special districts currently amounts to about 6 percent of the assessed valuation of coal production and mine improvements.

The assessed value of mined coal is assumed by DRI to be the present valuation of $2.30 per ton. This valuation is probably very conservative: future coal contract prices and, therefore, assessed valuation may well be much higher. Higher coal valuations would significantly increase the already generally favorable fiscal pictures of the county and the school district but would not improve the finances of Gillette. The estimated annual tax revenue directly generated by the Caballo mine when it reaches full production will probably be $3.3 million to $7.2 million (table III-3).

TABLE III-3.--Estimated tax revenue from the Caballo mine at full production

Tax	Coal assessed value per ton	
	$2.30	$5.00
State excise tax	$1,104,000	$2,400,000
Coal impact tax	552,000	1,200,000
Campbell Co. property tax[1]	1,656,000	3,600,000
Total	$3,312,000	$7,200,000

[1]Values do not include Campbell County tax on mine improvements.

Increased revenues by the middle 1980's will probably allow the county to reduce its tax rate and/or to increase its services substantially.

A change in the assumed start-up sequence would change the magnitude of the impacts. The schedule for mine start ups used in DRI's analysis is based on best current information.

Like the county, the school district will probably be able to finance needed facilities and services from its own resources. Available revenues are projected to exceed needs for expenditures by $11.4 million per year; thus, there will probably be opportunity to reduce local mill levies and/or expand services.

The present values of the net impacts of the Caballo mine over the 15-year public-finance analysis period, discounted at 7 percent, are given in table III-4.

TABLE III-4.--Estimated present values of net impacts of the Caballo mining operation

Net fiscal impacts	Present values
Campbell County--------	$1,380,000
City of Gillette-------	-3,430,000
Campbell County School District------	2,580,000
Total----------	$530,000

J. TRANSPORTATION AND UTILITIES SYSTEMS

Impacts to roads and railroads will be of moderate significance during mining, in that traffic will increase considerably above present levels. Postmining impacts, however, will be of negligible significance.

1. ROADS

During the life of the Caballo mine, traffic will increase over local roads (fig. I-1), mainly the route from Gillette to the mine via Highway 59 and T7-Hilight Road. If no one shares rides, 360 cars a day, distributed over three work shifts, will go to and from the site during the 35 years of full production.

Mining will cause no rerouting or changes to primary roads. The T7-Hilight Road will be relocated in about the year 2002. Several miles of minor roads in the mine will be destroyed.

2. RAILROADS

Transportation of the coal from the Caballo mine at full production will add about 22 unit-trains (100 cars of 100-ton capacity each) per

week to the Burlington Northern lines, more than present total traffic. The increase in rail traffic near Gillette will increase traffic congestion, interference with access to private property, air pollution, fuel consumption, wear on track and equipment, noise, chances of derailment, and accidents between cars and trains (FES 79-17, April 1979).

3. AIR TRANSPORT

Air traffic to and from Gillette will increase with increased population. Longer runways and more complex machinery may be needed. If large planes are used, residents near the airport may complain about the noise and emissions.

4. POWERLINES

A 69-kV powerline and several distribution lines that cross parts of the proposed minesite will be temporarily rerouted around active mining operations, but there will be no permanent impact because they will be replaced on the regraded topography.

K. RECREATION

Impacts to recreation will be of little significance because the land surface is privately owned and little used for recreation. At present, the company allows hunters on the property with permission, except in the area of the mine plantsite. During mining, only a small portion of the leasehold will be closed to hunting at any one time.

L. CULTURAL RESOURCES

Impacts to cultural resources will probably be of little significance. Known archeological and historical sites are not considered to be eligible for nomination to the National Register of Historic Places. Salvage excavation has fully recorded all known sites on the leasehold, including two known sites on the area to be disturbed. Further excavation, required for archeological clearance before mining, is expected to recover most of the significant information from most sites.

Adverse impacts on regional cultural resources are anticipated because of increased population in the Powder River Basin (FES 79-17, April 1979).

M. VISUAL RESOURCES

Impacts to visual resources will be limited during mining and of little significance after reclamation. The impacts are determined by BLM's visual resource rating procedure. The leasehold will remain within the same BLM scenic quality (C) and visual management (III and IV) categories during and after mining.

CHAPTER IV

MITIGATING MEASURES

The measures to be employed to mitigate adverse impacts of the proposed action on the environment are (1) those proposed by the applicant as a part of the mining and reclamation plan (if the plan is approved, the measures are binding on the applicant); (2) those measures not specifically proposed by the applicant in the mining and reclamation plan but required to meet the standards established by various Federal and State laws and regulations; and 3) the additional requirements or stipulations that can be imposed at the discretion of the regulatory authority. The mitigating measures of (1) and (2) above are outlined in chapter I.

Additional mitigations that could be be imposed at the discretion of the regulatory agency will be based on need as indicated by the failure of proposed and required mitigations. Failure of mitigations will be identified through required monitoring and observation during required inspections by OSM, USGS, BLM, and responsible State agencies.

A. POSSIBLE STATE AND LOCAL GOVERNMENTAL ACTIONS

Rapid energy development is a mixed blessing to the local community. Some beneficial impacts do occur; incomes rise, unemployment declines, property values increase, retail trade and business services enjoy increased receipts, and workers are better able to find jobs. Unfortunately, adverse impacts also occur. These include financial impacts on public services and facilities compounded by delays in the provision of adequate private services, such as housing. The lack of amenities can be reflected in social disorders.

The most severe current and anticipated socioeconomic impact is faced by the city of Gillette. Moore and others (1977) estimate that Gillette will be unable to pay for $35 million of the $60 million in needed capital expenditures by 1983 unless additional financial assistance is provided. Hayen and Watts (1975) estimate the city's projected budget deficit will be $2.6 to $3.2 million in 1985.

The primary source of Gillette's financial problem is caused by the fact that the taxable physical facilities of the mines, mineral production, and related energy developments are usually located in the unincorporated portion of Campbell County. Gillette will service most of the workers and their dependents from countywide energy projects, but taxable valuations of energy development are not subject to municipal taxes. The city faces a short-term cash-flow problem caused by the necessity to expand services and facilities in advance of limited mineral tax revenue distributed by the State, compounded by the long-term problem of a tax base that is inadequate to support needed expenditures. The city's revenue shortfall can be alleviated by grants, loans, prepaid taxes, increased indebtedness, and increased local taxes.

General measures for mitigating impacts on the community are described in Bronder and others (1977), Gilmore and others (1977), Moore and others (1976), Moore and Loomis (1977), and the U.S. Department of Housing and Urban Development (1976). Carter Mining Company has undertaken several mitigating actions. They gave a training grant to Casper College to teach coal field technology to Wyoming residents and have employed graduates of this program. A development consisting of 30 patio homes, 130 townhouses, and 80 apartment units has been coordinated by Carter Mining Company in conjunction with other companies.

A number of options presently exist for assisting Gillette; there are, however, some difficulities with each option:

- State loans and grants from the Farm Loan Board.--Loans and grants from severance tax and mineral leasing revenues have been and are likely to continue to be the easiest recourse for the city to obtain large amounts of capital. The projections of city finances for future years suggest that a substantial number of grants, rather than loans, are needed. Since the Caballo mine and other Campbell County mines are contributing to these revenues, it is reasonable to hope that many of the city's capital needs could be met by the Farm Loan Board. However, Gillette must compete with other public entities in Wyoming for these funds.

- County assistance.--Campbell County, which is presently in an excellent financial position, could assist the city in a number of ways:
  (1) The county could assume responsibility for some services that are presently provided or partially provided by the city, such as the airport. The county has already assumed responsibility for fire protection.
  (2) The county could act through the Joint Powers Board to pay for all or part of new capital facilities such as utilities systems.
  (3) The county could improve the city's ability to finance its debt by placing the full faith and credit behind Joint Powers Board loans.

- Federal grants for utilities construction.--The State could give priority to Gillette for Federal grants, such as Environmental Protection Agency (EPA) projects. This, however, would involve refusing funds to some other municipality.

- Optional local tax.--The city can continue to pass its optional 1 percent sales tax (the tax must be resubmitted to city voters every 2 years) and to earmark these funds for local capital projects.

- Industry assistance.--Other industries have acted, and Carter Mining Company could act, as a resource of last resort to the city, providing assistance where other options are not available.

The Wyoming Community Development Authority (WCDA) could have offerred another recourse to the city. Through the WCDA, the city could have consolidated its existing debts into a single, new issue. In a ruling involving the WCDA, the Wyoming State Supreme Court ruled that the State cannot pledge future excise tax money to repay bond issues without a statewide election.

Several actions, all of which would require changes in State legislation, could further reduce the imbalance of revenues between municipalities and other governmental entities in Wyoming resource development areas and/or inrease Gillette's power to control its own situation:

- Expansion of municipalities' share of mineral leasing royalties.-- Newly enacted state legislation allocating a share of leasing royalties to affected municipalities appears to be well designed to deal with revenues imbalances. One means of further assistance would be to increase the portion (presently 7.5 percent) of leasing royalties that go to municipalities.

- Increased jurisdiction for the Wyoming Industrial Siting Commission.-- Presently, the Siting Commission does not have jurisdiction for developments with capital costs of less than about $58 million. New coal mines in Campbell County have been coming in at just below this level. Reducing the legal minimum capital investment in the Siting Commission's enabling legislation would give the Commission power to require a larger role by Campbell County industry in mitigating impacts.

B. ALTERNATIVE METHODS OF FUGITIVE DUST CONTROL

Federal regulations require a review to determine the best available control technology where potential fugitive dust emissions are equal to or greater than 250 tons per year. Each mine operator will have to employ the Best Management Practices (BMP) for fugitive dust regardless of predicted concentrations during operation. Thus, the Secretary could require an appropriate combination of the following fugitive dust controls:

- Pavement or equivalent stabilization of all haul roads used or in place for more than 1 year;

- Treatment with semipermanent dust suppressant of all haul roads used or in place for less than 1 year or for more than 2 months.

- Watering of all other roads in advance of and during use whenever sufficient unstabilized material is present to cause excessive fugitive dust;

- Reduction of fugitive dust at all coal dumps, truck to crusher locations through use of negative pressure bag house or equivalent methods. Inclusion of conveyor and transfer point covering and spraying and the use of coal loadout silos.

CHAPTER V

PROBABLE ADVERSE ENVIRONMENTAL IMPACTS THAT CANNOT BE AVOIDED

Although required mitigating measures will minimize impacts of the proposed Caballo mine, some adverse impacts cannot be avoided. Some adverse impacts that cannot be entirely eliminated are described in this chapter.

The slopes of the reconstructed surface of the minesite (4,300 acres) will be less steep than present slopes. Unavoidable subsidence of the reclaimed surface will take place; but the expected subsidence of 1 to 2 percent of the thickness of the replaced overburden should not significantly affect post-mining land use of grazing.

Destruction of the natural topographic features of the landscape is unavoidable, but no features are unique to the area. The Caballo mine will be a part of a broad belt of lowered land surface caused by coal mining in the Gillette area.

Exposed and unexposed paleontological resources, known to occur in the region, will be destroyed, disturbed, and removed. The significance of this impact cannot be meaningfully assessed because of the lack of data and evaluatory criteria.

Soil productivity potentials will be reduced on about 6,700 acres, and the existing 30 soil types will be replaced by relatively uniform mixed soils.

Dewatering during mining is expected to lower water levels as much as 3 feet within a mile of the mine, but this should not affect the availability of water for stock and domestic wells in the area. Following backfilling and reclamation, a shallow aquifer will be reestablished in in the soil at some time not yet identifiable. The extent to which the replaced spoil would constitute an aquifer, its yield compared to present aquifers, and its function with respect to remaining coal aquifers, is not now predictable with confidence, owing to lack of data. The quality of water in the new aquifer may be degraded to some extent from present conditions. This should not affect the suitability of the water for watering stock but may necessitate drilling to deeper aquifers to obtain water for domestic uses. Because surface runoff from the leasehold comes almost wholly from snowmelt and convective storms, any changes in local aquifer characteristics or quality of ground water as a result of mining should have little or no effect on streamflow.

Until reclamation is completed and a stabilizing plant cover established, any increased sediment yield from disturbed areas would be largely retained in sedimentation ponds with no significant impacts downstream. Thereafter, sediment yield from the reclaimed area should return approximately to premining rates.

With use of Best Available Control Technology and Best Management Practices, coal and soil dust, totaling more than 1,300 tons per year, will

cause an unavoidable but temporary deterioration of ambient air quality. Total air pollutants from the mining operation will add about 6 percent to regional pollution produced by existing and planned mines in the region. Dust concentrations will probably violate Federal and Wyoming secondary annual standards, as well as 24-hour standards, within 0.5 mile downwind from main traffic routes and coal-handling facilities, but generally not off the leasehold.

Even with proper controls, unavoidable emissions from vehicles, equipment, and accidental fires will cause a temporary reduction in ambient air quality on the leasehold and downwind. Diesel emissions and blowing dust from coal trains will occur. These emissions are expected to reach a peak in 1987 when coal production reaches 12 million tons per year. A population increase of 2,650 people will cause a deterioration in the ambient air quality of Gillette primarily due to vehicle emissions and increased power generation.

A grassland cover will probably be established within 3 to 5 years after disturbance. Thus, the vegetation reestablished on the approximately 6,700 disturbed acres will probably support cattle grazing within a decade.

Approximately 100 antelope and 10 sagegrouse will be progressively displaced during mining. They will not reinhabit the reclaimed area at present levels until vegetative diversity has been reestablished, probably 40 years or more after disturbance. Similarly, other animals, reptiles, and birds will be progressively displaced or destroyed, but most are expected to reinhabit reclaimed areas at about present levels within a few years of reclamation. With the temporary loss of stock ponds, about 20 pairs of waterfowl will be displaced, and amphibians will be displaced or destroyed. Impacts to raptors are expected to be minimal.

On a regional basis, the large influx of people (about 22,000) necessary to service and operate the coal mines, will create an increased demand for public and private services, such as housing, education, law enforcement, fire protection, medical care, maintainence of streets, water supplies, and waste disposal systems. The Caballo mine will contribute proportionately to these problems, especially during the first decade of its operation, when it will account for about 10 percent (about 2,650 people) of the regional population growth. Campbell County and its school district will benefit from the increased tax base from mining, while Gillette will receive much of the population and the associated demand for public goods and services, but collection of tax monies to pay for such goods and services will lag behind need for them. The rapid increase in population will accelerate social problems (chapter III), such as family problems, crime, unemployment, and urban sprawl. Gillette will be transformed into a larger community with the problems associated with larger towns and with boomtowns. The social and political structures of the area will change as the population increases. As the area's economy continues its transformation from a primarily agriculturally based economy to a primarily industrially based economy, people's relative

purchasing power will decline--especially those on fixed incomes like the elderly. A complete discussion and analysis of the total cumulative unavoidable impact of all projected operations in the area can be found in FES 79-17, April 1979.

Vehicle traffic on portions of Highway 59 leading to the mine will increase, as will traffic on secondary roads. An increase in rail traffic will disrupt road traffic at crossings and increase pollution and noise along the rail route from the loading site for the unit trains to the final destination of the coal. Populated areas near the airport will be affected by pollution from plane engine emissions and by noise caused by the increase in air traffic.

CHAPTER VI

THE RELATIONS BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

During its 40-year life, the proposed Caballo mine will produce about 463 million tons of low-sulfur subbituminous coal for electric-power generation in the Midwest.

During mining, ground-water levels will be lowered a few feet in wells within 350 feet of the surface within a mile or so of the mine. Postmining impacts are expected to be minimal and conflicts with anticipated water uses to be negligible. Stock ponds will be progressively removed during mining and replaced during reclamation. During mining, dust concentrations will probably violate standards on the leasehold a few times per year, but postmining impacts on air quality will probably be negligible.

During mining, 130 to 1,200 acres of minesite plus the acreage of the plantsite and mine roads will be out of production at any one time. Within 3 to 5 years after revegetation, grassland productivity may be slightly higher than before disturbance for a few years; ultimately, productivity will be lower than before mining, how much is uncertain. Vegetative diversity will probably be lost for 40 years or more, and wildlife species dependent on specialized habitat will probably be correspondingly displaced to adjacent habitat--notably, about 100 antelope and 10 sage grouse. Small mammals, birds, and reptiles and amphibians will be displaced or destroyed during mining but will probably reinhabit disturbed areas at nearly their present levels within a decade after reclamation.

Between its opening and about 1988, the proposed Caballo mine will contribute about 2,650 people to the region--about 10 percent of the anticipated regional population growth. During this period it will increase the demand for services, especially in Gillette. At full production the mine will annually contribute about $1.2 million to the State of Wyoming, $1.4 million to Campbell County, and $2.6 million to the Campbell County School District, but it will probably cost Gillette about $3.4 million annually. Regional coal resources are extensive, and employment for the miners will continue to be available in the area.

Mining will result in the study of known archeological sites that might not otherwise be studied, with a concomitant gain in knowledge; but it may result in the accidental destruction of unknown sites, and it will preclude further in situ study of the disturbed area.

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The major commitment of resources is the consumption of 463 million tons of the economically strippable coal reserves of the Powder River Basin. Mining of the coal and reclamation at the proposed Caballo mine will require undetermined amounts of electrical power, lubricants, diesel and gasoline fuel, ammonium-nitrate explosives, and structural materials.

Soil diversity will be greatly reduced on mined lands. During mining, vegetation production will be essentially lost from 130 to 1,200 acres of minesite plus the acreage of the plantsite and mine roads. The long-term productivity after reclamation will be less than premining productivity, and vegetative diversity and corresponding specialized habitats will probably be lost for 40 years or more. Regional populations of antelope and sage grouse will decline by an unknown percentage of the estimated 100 antelope and 10 grouse that will probably be progressively displaced during mining.

An unknown, but probably small, number of undiscovered archeological sites may be lost; the potential for future excavation of all archeological sites in the disturbed area will be lost.

CHAPTER VIII

ALTERNATIVES TO THE PROPOSAL

Approval of the applicant's mining and reclamation plan, as submitted, has been analyzed as the proposed Federal action in this statement. Alternatives to that course of action are discussed below.

A. NO ACTION

Pursuant to implied covenants of both the Federal mineral leasing laws and the existing lease agreements, the Secretary of the Interior must respond to a legitimate application to conduct operations on a valid Federal lease, provided all terms and conditions of the lease have been met. The Secretary's response may be approval as proposed, rejection on various legitimate grounds, or to defer decision based on proper grounds. "No action" on the applicant's proposed mining and reclamation plan would mean maintaining the status quo on the leasehold. The impacts of taking no action would be the same as described subsequently under the alternative "Reject the mining and reclamation plan."

B. DEFER FEDERAL ACTION

In the event of noncompliance of the applicant's proposed mining and reclamation plan to provisions of the Surface Mining Control and Reclamation Act of 1977 (30 USC 1201), the Secretary must defer action on the proposed plan. For other proper causes, he may also defer decision. Such causes could include, but are not limited to, the time required and the need for the following:

- Modification of the proposal to correct deficiencies unrelated to SMCRA or to reduce or avoid environmental impact.
- Acquisition of additional data to provide an improved basis for technical or environmental evaluation.
- Further evaluation of the proposal and (or) alternatives.
- Development of an adequate system to monitor impacts for management and regulation.

The principal effect of deferring action would be a short-term delay in the imposition of all related impacts, both adverse and beneficial, of the applicant's proposal discussed in this statement.

The mining and reclamation plan included in this statement was prepared prior to the promulgation of the initial regulations (30 CRF 700) required under section 502 of the Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87).

The Office of Surface Mining (OSM), which was created by that act, has not reviewed the plan for compliance. Therefore, the mining and reclamation plan may not reflect the requirements of the initial regulations. In this statement the applicable initial regulations are considered required and are moved to the appropriate chapter.

The mining and reclamation plan was returned to the operator, with a request that it be revised in accordance with the applicable initial regulations. As soon as the mining and reclamation plan is revised and returned to the Regulatory Authority, it will be evaluated by the OSM to determine compliance with the requirements of 30 CFR 700.

Action could also be deferred until the plan is modified to include one or more of the alternatives discussed below in subsection E. These alternatives if implemented would reduce or avoid some environmental impacts of the proposed action.

C. PREVENT DEVELOPMENT OF FEDERAL COAL LEASES W-3397 AND W-49644

1. REJECT THE CABALLO MINING AND RECLAMATION PLAN

The Secretary may reject a proposed plan that does not meet the prescriptions of applicable law and regulations under his authority, including the potential for environmental impact that could be reduced or avoided by adoption of a significantly different course of action by the applicant. Except when a mine plan does not comply with existing regulations, the Secretary cannot under present circumstances reject the proposed plans to the extent that a de facto cancellation of a lease results unless he seeks and obtains additional authority from the Congress. Viability of this option is dependent upon timely legislative action; the option of rejecting the proposed plans pending legislation remains available.

If the Secretary were to reject the mining and reclamation plan, the lease would not be mined, and impacts previously discussed would be deferred until an acceptable plan was approved. The lease would continue in its present condition, subject to modification by natural processes and by the continuation of other existing activity and uses--and to further moodification by the surface owner to meet other uses. However, the development of alternative sources of energy, such as other coal mines in the county, or a reduction of national energy consumption, could result. The applicant could correct the deficiencies in the plan and resubmit a modified mining and reclamation plan for approval. The result would be similar to that described in the alternative "Defer Federal action."

2. SEEK LEGISLATION TO CANCEL FEDERAL COAL LEASES W-3397 AND W-49644

The Secretary has very limited authority with respect to cancellation of an existing Federal coal lease. One such authority is prescribed in the lease terms entitled "Proceedings in case of Default."

A second authority was mandated by provisions of sec. 6 of the Federal Coal Leasing Amendments Act of 1975 (P.L. 94-377) which was subsequently written into regulations as 43 CFR 3500.5. The authority relates to failure of the lessee to meet the requirements for diligent development of the lease as defined by the Act.

The authority to cancel on other grounds would require congressional authorization for such action as well as for the requisite funds for compensation to the lessees. The Administration has not requested such legislation, and the Congress has not initiated such legislation related to the matters considered in this statement. The possibility of such actions is a matter for furhter consideration by the Administration and the Congress in the light of this environmental statement and other relevant nonenvironmental concerns.

To the extent that future coal production from this lease was curtailed or halted, alternative sources of energy would be required to meet anticipated needs and demands. The time required to replace the coal production potential could range from a few to several years. If this lease were cancelled through congressional authorization, all physical, biologic, and socioeconomic impacts stemming from the proposed mine would be avoided. Conversely, if development eventually were authorized, environmental impacts as discussed previously in this statement would occur, although impacts would be deferred in time and perhaps reduced because of changes in technology or requirements imposed at that time.

3. EXCHANGE THE EXISTING LEASES

If the Secretary determines it to be in the public interest, he may initiate a proposal to the lessee for exchange of the existing Federal lease involved in this proposal for lease of other tracts of Federal coal or tracts of Federal sodium, phosphate, potash, or sulfur of comparable value, or for a grant of various future rights.

The Department of the Interior considers that the public interest would be so served if the Secretary finds that the benefits of production from the lease would not outweigh the adverse effects, or threat of damage of destruction to agricultural production potential, or scenic, biological, geologic, historic or other public interest values from lease operations. In exercising his discretion to exchange mineral leasing values in the public interest, the Secretary shall consider, but is not limited to, consideration of these elements of the public interest: recreational use; archeological or historic values; threatened or endangered species; proximity of residential or urban areas; study for potential inclusion in the wilderness or wild and scenic rivers systems; and value for public highways, airports, and rights-of-way.

Should the Secretary initiate such a proposal, the lessee is under no obligation to enter into such negotiations and may refuse to consider it.

If such a proposal is made and is rejected by the lessee, or if negotiations are entered and not agreeably concluded by the parties, and if the operations described in this statement are not otherwise prevented, such operations would eventually proceed and result in the impacts identified herein.

If an exchange proposal is made, accepted, and agreeably concluded for coal that is contiguous or very near to the existing lease, the proposed plan would have to be revised, resubmitted, and assessed. If the new plan encompassed the same methodology to be used in coal development, many of the impacts described herein would likely be very similar to those resulting from the new proposal, with a relatively short-term delay (several years) in their initiation. If a wholly different methodology is proposed for development of the replacement lease (e.g., underground versus surface mining) it could be substantially different from those described in this statement, and cannot be forecast at this time.

Presumably the unacceptable impacts or effects prompting the exchange would be avoided or substantially reduced, in development of the replacement lease, and found to be in the public interest. The existing lease would be relinquished, would not be mined, and would continue in its present condition as discussed below.

If an agreeable exchange were made for coal located elsewhere, or for a different mineral commodity located elsewhere, the relinquished lease would continue in its present condition, subject to modification by natural processes, by the continuation of other existing uses and activity, and to further modification by the surface owner to meet other uses. Potentially, the coal reserves relinquished would be withdrawn from development and this source of energy foregone. Direct financial benefits to the public may change in an exchange of leases.

The impact of exploration and development of the replacement lease under these circumstances will be translocated in space and time. They will relate to time and location, physical environment at the new site, mineral commodity involved, development technology proposed and approved, and other factors, none of which can be quantified or evaluated until the replacement lease is identified. The environmental impact of potential development of the replacement lease rights to be granted would be evaluated and considered in the exchange process, and while they may be greater or less than those described in this statement, they must be ultimately judged by the Secretary to be more environmentally acceptable than development of the relinquished lease, and to be in the public interest. Costs to the Department in identifying and evaluating one or more replacement tracts to be offered in the exchange could be substantial; and very likely by significantly more than the lessees' costs in establishing the fair market value of the tract to be relinquished.

4. SUSPEND OPERATIONS

The full development of existing leases could be delayed by suspension of operations. If such action were taken, there would be no additional

incremental environmental impact on the area, and it would continue in its present condition, subject to further modification by natural processes, the continuation of existing mining activity, and such future uses of the surface as the owners may decide.

The authority of the Secretary of the Interior to suspend operations on exisitng leases has already been utilized on other Federal leases. Suspension of operations of this existing lease, for reasonable periods, with proper grounds, could be imposed. The Secretary cannot, under present circumstances, suspend operations to the extent that a de facto cancellation of a lease results unless he seeks and obtains additional authority from Congress. Viability of this option is dependent upon timely legislative action; the option of suspending operations pending legislation remains available. Impacts of this alternative would be similar to those described under "Cancel the lease."

5. FEDERAL REACQUISITION OF LEASED RIGHTS

The outstanding leasehold interests could be acquired by the Secretary. The ability to acquire the leasehold interests is not granted by the existing relevant statutes and would require Congressional authorization for such action as well as for the requisite funds for compensation of the lessees. To date, the Administration has not requested such action, and the Congress has not initiated or considered such legislation; the possibility thereof is thus conjectural at best. The major effects of such Congressional authorization would be similar to those of cancellation of the leases as previously discussed.

D. RESTRICT DEVELOPMENT OF FEDERAL COAL LEASES W-3397 AND W-49644

The subject leases convey the right to develop, produce, and market the Federal coal resource thereon if all other terms and conditions have been met by the lessee. In general, the Secretary does not possess the authority to arbitrarily restrict development either as to location or rate. Various measures that may tend to restrict development may be taken by the Secretary at any time in the interest of conservation of the resources or in the protection of various specific environmental values in accordance with existing laws and regulations; for example, the National Historic Preservation Act of 1966, the Endangered Species Act of 1973, etc.

Thus, under present conditions, a general effort to restrict or regulate development of the existing lease for reasons other than failure to comply with existing laws and regulations would constitute a selective application of the "prevent development" alternative already discussed; that decision, as it related to impacts, possible litigation, and the need for authorizing legislation, would be relevant in this instance.

In addition, application of this alternative might not permit maximum recovery of the coal resources and would thus be contrary to principles

of conservation embodied in the legislation which authorizes the leasing of these lands for the purposes described. It is entirely possible that such selective mining would leave isolated blocks of coal that might never be recovered owing to the high costs of mining such remnant areas at a later date.

Numerous alternatives of restricted development can be considered, but two in particular seem logical.

1. APPROVE THE PROPOSED MINE PLAN EXCLUDING THE 320 ACRES OF PEABODY COAL COMPANY PREFERENCE RIGHT LEASE APPLICATION W-32063 IN SECTIONS 23 AND 26

The Secretary could approve mining coal from Federal leases W-49644 and W-3397 (map 1) without mining the coal in the 320-acre tract of the PRLA. This would allow orderly mining to proceed on existing Federal and State leases in the Caballo mine. Should this PRLA tract be awarded in the future, further approval to mine it would be required. The present plan proposes mining the 320-acre PRLA tract about the year 2000. The Carter Mining Company expects to ultimately acquire ownership of the PRLA tract from Peabody Coal Company.

Exercise of this option would not significantly interfere with orderly mining on the balance of the Caballo mine as presently scheduled and contemplated in the proposed plan. The PRLA tract, if acquired by Carter Mining Company before the year 2000, would be directly accessible from operations in either Pit A or Pit C. Under such circumstance, no differences in environmental impacts from those already described would occur.

Should the preference right lease not be issued, and not reassigned to Carter Mining Company, a minor reduction of physical, social, and economic impacts of the total proposal would result. In these circumstances, an additional impact on the public interest and conservation of the coal resoure might possibly result from the PRLA tract not being mined at all. However, other options not involving Carter Mining Company do exist for future recovery of the coal under application, and the potential loss of the resource to mining is thus wholly conjectural and speculative at present.

2. APPROVE ONLY THE MINING PROPOSED FOR PITS A AND C, AND DEFER APPROVAL ON THE BALANCE OF THE PROPOSED MINE

The rationale underlying this option is that the proposed mine does not include, but effectively surrounds an unleased tract of 320 acres of Federal coal that is not presently under lease application.

This unleased Federal coal tract (map 1) could be entirely surrounded by mining operations in the future and possibly lost to future independent recovery if it is not leased to Carter Mining Company and incorporated in the presently proposed Caballo mine, or if it is not leased to Peabody Coal Company or its assignees in conjunction with the existing PRLA tract.

It is wholly conjectural at this point as to whether this 320-acre unleased Federal tract could be mined later as an independent operation, or whether, if it could be combined with the PRLA tract, the two tracts would constitute an economically viable independent operation.

Adoption of this alternative would not interfere with immediate operations as scheduled under the plan presently proposed by the applicant.

It could materially affect the applicant's longer term commitments of coal delivery. This option would allow the Secretary to retain other options for assuring maximum utilization and recovery of the resource, and the time in which to exercise those options, without jeopardizing the applicant's existing interests and commitments in the short term.

Under this option, a more likely economically viable separate operation comprising the proposed Pit B, the unleased Federal tract, and the Peabody PRLA tract could be developed.

If Carter Mining Company were to acquire the two 320-acre tracts, their development and that of Pit B could be approved later. In such a case, the overall impacts of the project would be increased a minor amount over those already described for the proposed action, and maximum recovery of the coal resource assured.

If Carter Mining Company were not to acquire the two tracts, the impacts already described in this EIS would be reduced by a like minor amount.

Mining operations involving existing Carter Mining Company leases and holdings adjacent to the proposed Caballo mine on the east, or existing approved mining operations contiguous on the south, could ultimately acquire and develop the two 320-acre tracts (map 1). Such proposals have not been made and this potential is entirely conjectural at this time.

E. REQUIRE MODIFICATION OF THE MINING AND RECLAMATION PLAN

Some of the environmental impacts of the Federal action could be avoided if the mining and reclamation plan were modified through the use of stipulations and conditions to require inclusion of one or more of the alternatives discussed below in addition to modifications discussed in chapter IV. Special stipulations could be added to the plan to mitigate some of the indirect effects of the mining or to improve the plan technically. Such stipulations and conditions must be reasonable; if unacceptable to the lessee, they could inhibit development of the Federal leaseholds, thereby contributing to the impacts discussed above in alternative A.

1. SCIENTIFIC ACCESS TO GEOLOGIC INFORMATION AT THE MINE

Scientific investigation of the development of the coal bed is continuing. The geologic relationship of the Wasatch-Fort Union unconformity associated with the coal bed has yet to be definitively interpreted and accurately

traced. Paleontological values have not been surveyed. The Secretary could require that the company provide limited periodic access to scientists to inspect coal exposures and cores upon valid request to the appropriate regulatory authority, thereby promoting scientific access to local geologic information. Safety and liability provisions required by the mine operator as a condition of access would have to be evaluated and approved by the regulatory authority.

2. MODIFICATION OF PROPOSED SOIL-RECLAMATION PROCEDURES

The applicant has analyzed soil samples from the proposed mine and determined that most of these soils are suitable for plant growth.

It is well known that snow fences retain snow and increase soil moisture locally. Snow fences could be constructed on north- and west-facing slopes, which are often blown free of snow. In addition to potential erosion, wind would cause a reduction in soil moisture on these slopes. This is supported by information contained in Tabler and Johnson (1971). Snow fence specifications are available at the BLM Casper District Office. If the Secretary required this technique, reclamation effectiveness of early spring seeding would increase on north- and west-facing slopes due to increased soil moisture resulting from the use of snow fences. Given average precipitation and proper compliance, chances of failure of this measure would be minimal.

If replaced topsoil becomes compacted by heavy equipment during placement of material and by soil settlement over time, seedbed preparation could consist of deep tillage, normally 12 to 18 inches deep, with a subplow or ripper teeth on a crawler tractor. This would break up compacted soil and increase infiltration of precipitation. This tillage should be done on the contour for sloping areas. Impacts of lowered soil productivity would be reduced.

Soils are subject to erosion by wind and water during the variable period of time between application of topsoil and seeding. As specified by the regulatory authority as conditions warrant, mulching, contour furrowing, and pitting could protect soils from erosion. Inadequate mulching would reduce the effectiveness of this measure. The Company proposes to plant a mixture of seeded species in reclaimed areas. Because this mixture is designed for the production of livestock forage, it is composed mostly of grass species. A major long-term impact of that proposal on vegetation would be the loss of existing plant and wildlife species diversity as discussed in chapter III. The following two alternatives could increase species diversity in reclaimed areas, thus reducing the impact of loss of native species diversty and reducing the time required to restore native range and wildlife.

a. TRANSPLANT VEGETATION IN TOPSOIL

The loss of species diversity in reclaimed areas could be alleviated if the top 3 to 6 inches of topsoil were stripped separately and replaced

immediately on prepared topsoil material. Seeds and rootstock contained in the 6-inch soil layer would grow during the first year. Studies by Herbert Fisser, University of Wyoming (oral communication, October 5, 1977), indicated that this practice is effective in reestablishing native plants. It would also allow establishment of species for which there are no commercially available seed sources.

This measure would not be practical for the topsoil that has to be stockpiled but could be used for topsoil hauled directly to reclaimed areas after it is stripped. This alternative would require the company to strip and redistribute two separate levels of topsoil, considerably increasing operating costs.

This method would provide a greater potential for reestablishment of native species after reclamation than alternative (b) below.

b. TRANSPLANT PATCHES OF VEGETATION

The loss of plant species diversity could also be alleviated by immediately transplanting patches of topsoil and vegetation from areas scheduled for topsoil stripping to areas undergoing reclamation. This measure would hasten reestablishment of existing native plant species because the patches would be a seed source. The patches should be about 4 feet square and 1.5 feet thick and should be transplanted at a density of about one patch per acre. Patches would be taken from vegetative types present at the mine, in proportion to ther existing density of these vegetative types when possible.

Without irrigation during the first season, transplanted patches of vegetation would have an estimated survival rate of 50 percent. If the transplanted vegetation were to die, the surrounding reseeded species would prevail and the reestablishment of a diverse plant community would depend on natural succession.

This method would have less potential for reestablishing native species than alternative (a) above.

3. MODIFICATION OF PROPOSED WILDLIFE-MANAGEMENT PRACTICES

The Secretary could require the following changes in the proposed mining and reclamation plan. These measures could reduce the loss of wildlife at the Caballo mine.

Construction of piles of rocks and boulders covering 100 to 200 square feet at scattered locations in the reclaimed area at the rate of one per 10 acres could be required. These rock piles woud replace outcrops destroyed during mining. If this measure is not required, the reclaimed area would be nearly void of protective concealment and nesting, perching, and denning areas for some species of wildlife. The chance of this measure failing is negligible unless a sufficient number of rocks and boulders cannot be obtained during overburden removal.

The construction of new powerlines to the mine could cause increased numbers of raptors to be electrocuted unless their protection is considered in powerline design and construction. If this measure is not required, a significant number of raptors that hunt in this area--primarily eagles--may be electrocuted while landing on or taking off from powerlines. The chance of failure of this measure is minimal if the guidelines recommended in "Raptor Research Foundation" (1975) are used.

Fences, other than those used for reclamation or rights-of-way, could be designed to allow the passage of antelope. Specifications for appropriate fence design are as follows: a three-strand fence with the top wire no higher than 38 inches above the ground and a barbless bottom wire at least 16 inches above the ground.

If this measure is not required, antelope could be restricted to areas that may have inadequate water or food. The proposed fences could form barriers to local movement and migration, increase the number of antelope deaths from entanglement in fence wire, and result in the deaths of a large number of animals during severe winter storms by inhibiting movement to areas of protection. The chance of this measure failing is moderate, due to the necessity of using net wire fences for rights-of-way and reclamation areas to prevent loss of wildlife and domestic animals along roads and railroads and to prevent animals from hampering vegetative success during reclamation.

In addition to fences, the Secretary could also require that overpasses of roads over waterways be of sufficient height and width to allow wildlife to pass beneath the structures. Without this measure, fence rights-of-way would be continous barriers that could prevent migration or localized movement, exclude some wildlife from areas of food and water, and cause a large number of animals to die in severe winter storms by preventing movement to protected areas. The possibility of this measure failing is negligible.

4. UTILIZATION OF BUSES TO TRANSPORT EMPLOYEES TO AND FROM WORK

To relieve the increased traffic to and from the mine on State Highway 59, the Secretary could require the company to provide bus service from Gillette to the mine. Assuming that 15 trips per day were made using 40-passenger buses and that all employees used buses, the projected increase in traffic on State Highway 59 due to the use of private cars to commute to the mine would be reduced to 1 percent. In addition to relieving traffic congestion and lowering fuel consumption, the probability of accidents would be reduced. The possibility that the entire work force would use the buses is not likely. If only half the force used this service, there would be a change in projections of mine-related traffic from 20 percent to 10 percent above present levels. The Department has not yet determined if the Secretary has the authority to require this measure.

5. STAGGERING OF WORK SHIFTS AT ADJACENT MINES

The Secretary could require that adjacent mines, including the Caballo mine, stagger their work shifts to reduce traffic loads on State

Highway 59 and local roads at peak use times. This effort would be successful in reducing traffic hazards whether or not buses were used. The companies may have difficulty in gaining acceptance of staggered work shifts by the workers. The Department has not yet determined if the Secretary has the authority to require this measure.

F. SOCIOECONOMIC MITIGATIONS

The Federal Land Policy and Management Act of 1976 [P.L. 94-579 sec. 43 U.S.C., sec. 1747(c)] authorizes the Federal Government to lend to States and communities 55 percent of the Federal mineral revenues they anticipate receiving during any 10-year period. The interest on such loans would not exceed 3 percent, and the Secretary would determine the amount and duration for each loan. The loans could be used for planning, construction, and maintenance of public facilities, and the provision of public services in communities impacted by development of Federal minerals. The use of loan funds apparently awaits Federal appropriations and the establishment of rules and regulations.

The Secretary could direct that the Department expeditiously develop rules and regulations, and that the appropriations for the loan program be sought. In addition, the Secretary could direct that the Department provide the city of Gillette and other communities impacted by development of Federal minerals with detailed information on this loan program.

Caballo mine showing topography, vegetation, drainage, railroad, road, and facilities.

CHAPTER IX

CONSULTATION AND COORDINATION WITH OTHERS

A. CONSULTATION AND COORDINATION

Much information was gathered and analyzed by the Department of the Interior in the preparation of the final environmental impact statement on the regional development and many agencies and groups participated. Insofar as their analyses and data were used in part to prepare this statement, all people, groups, and agencies listed in FES 74-55 (U.S. Bureau of Land Management, 1974, p. I-877 to I-878) and in FES 79-17 (U.S. Bureau of Land Management, 1979, p. R9-1 to R9-4) also aided in the preparation of this statement. Public comments received and the results of public hearings held during the preparation of FES 74-55 and FES 79-17 were considered in the preparation of the present statement. The Casper District Office of BLM provided direct input of data and substantial assistance to the preparation of this environmental statement.

Additional copies of the final environmental statement will be available to the general public for inspection and review at USGS and BLM offices to be announced in the Notice of Availability in the Federal Register at the time the FES is released. Until the limited supply is exhausted, a single copy of the FES can be ordered by mail, without charge, from the U.S. Geological Survey, Environmental Impact Analysis Program, Mail Stop 701, Box 25046, Federal Center, Denver, Colorado 80225 (phone: (303) 234-3960, FTS 234-3960).

B. COMMENTS AND RESPONSES

Comments were received from the following:

Federal agencies	Page
Advisory Council on Historic Preservation	IX-3
U.S. Department of Agriculture:	
Soil Conservation Service	IX-5
U.S. Department of Health, Education, and Welfare	IX-7
U.S. Department of Labor:	
Mine Safety and Health Administration	IX-8
U.S. Department of the Interior:	
Bureau of Indian Affairs	IX-9
Bureau of Mines	IX-10
Bureau of Reclamation	IX-11
Fish and Wildlife Service	IX-12
Heritage Conservation and Recreation Service	IX-14
U.S. Environmental Protection Agency (Response includes letter from the Assistant Secretary for Land and Water Resources, Office of the Secretary, U.S. Department of the Interior)	IX-15

State and local agencies

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Department of Planning and Development, city of Gillette, Campbell County, Wyoming	IX-20
Geological Survey of Wyoming	IX-22
Montana Department of Fish and Game	IX-23
Utah State Planning Coordinator	IX-24
Wyoming Department of Agriculture	IX-25
Wyoming Department of Economic Planning and Development	IX-26
Wyoming Department of Environmental Quality:	
Solid Waste Management	IX-28
Water Quality Division	IX-29
Wyoming Executive Department:	
Planning Coordinator's Office	IX-30
Wyoming Game and Fish Department	IX-32
Wyoming Recreation Commission	IX-40
Wyoming State Conservation Commission	IX-41
Wyoming State Highway Department	IX-42

Applicant

Carter Mining Company	IX-43

Other organizations

Powder River Basin Resource Council	IX-73

Advisory Council On Historic Preservation

1522 K Street N.W.
Washington D.C.
20005

November 27, 1978

Director
U.S. Geological Survey
National Center
Mail Stop 108
Reston, Virginia 22092

Dear Sir:

This is to acknowledge receipt of the draft environmental statement for Caballo Mine, Campbell County, Wyoming, on October 12, 1978. We regret that we will be unable to review and comment on this document in a timely manner pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969.

1 Nevertheless, U.S. Geological Survey is reminded that, if the proposed undertaking will affect properties included in or eligible for inclusion in the National Register of Historic Places, it is required by Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320) to afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking prior to the approval of the expenditure of any Federal funds or prior to the issuance of any license. The "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800.4) detail the steps an agency is to follow in requesting Council comment.

Generally, the Council considers environmental evaluations to be adequate when they contain evidence of compliance with Section 106 of the National Historic Preservation Act, as amended. The environmental documentation must demonstrate that either of the following conditions exists:

1. No properties included in or that may be eligible for inclusion in the National Register of Historic Places are located within the area of environmental impact, and the undertaking will not affect any such property.

Responding to: Louis S. Wall
Assistant Director
Office of Review and Compliance
Advisory Council on Historic Preservation
1522 K Street, N.W.
Washington, D.C. 20005

1 The Geological Survey has complied with the required procedures. See p. II-26, 1I-27, and 11I-14. It has been determined that none of the cultural resources identified on the leasehold is listed on or eligible for nomination to the National Register of Historic Places. The State Historic Preservation Officer has been consulted; see Appendix A.

In making this determination, the Council requires:
--evidence that the agency has consulted the latest edition of the National Register (Federal Register, February 7, 1978, and its monthly supplements);

--evidence of an effort to ensure the identification of properties eligible for inclusion in the National Register, including evidence of contact with the State Historic Preservation Officer, whose comments should be included in the final environmental statement.

2. Properties included in or that may be eligible for inclusion in the National Register of Historic Places are located within the area of environmental impact, and the undertaking will or will not affect any such property. In cases where there will be an effect, the final environmental statement should contain evidence of compliance with Section 106 of the National Historic Preservation Act through the Council's "Procedures for the Protection of Historic and Cultural Properties".

Should you have any questions, please call Brit Allan Storey at (303) 234-4946, an FTS number.

Sincerely,

Louis S. Wall
Assistant Director
Office of Review and Compliance, Denver

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P.O. Box 2440, Casper, WY 82602

November 28, 1978

Director
U. S. Geological Survey
National Center, Mail Stop 108
Reston, Virginia 22092

Dear Sir:

The opportunity to review and comment on the draft environmental impact statement on the mining and reclamation plan proposed by the Carter Mining Company for surface mining of coal at the Caballo Mine, Campbell County, Wyoming is appreciated. We offer the following comments for your consideration in preparing the final.

1 Page II-9, Soils - Were Soil Conservation Service soil surveys used as a base? If so, then proper credit should be given.

2 The soils are not described in any detail. Stripping to salvage topsoil will be difficult, especially where surface layers are suitable but subsoils and/or substratums are not.

3 Page III-3, Soils - The statements concerning impacts on soils are very indefinite. Suggest that experience of impacts on soils in other mining developments be used to make these statements more definite.

4 Page III-4, Surface Water - The plan calls for reestablishing stockwater ponds. Due to the slope changes in the major drainages it should be stated that the number and size of ponds will be determined by analysis of channel stability and that the primary purpose of the ponds may be grade stabilization rather than stockwater. The new structures require stable principal spillways and will be more costly than ponds designed only for stockwater.

5 Page III-8, Vegetation - The first sentence is not in agreement with the first sentence under Soils on page III-3. Under Vegetation the statement is definite that cattle grazing can be supported after mining. The statement under Soils is not definite.

Responding to: Frank S. Dickson
State Conservationist
United States Department of Agriculture
Soil Conservation Service
P.O. Box 2440
Casper, Wyoming 82602

1 The soils map (map 3) was modified from a soils map submitted by the Carter Mining Company with their mining and reclamation plan. The map submitted by Carter was prepared by Mine Consultants, Inc., based on a detailed soil survey in July 1977.

2 The mining and reclamation plan contains detailed descriptions of the soils. A preliminary soil survey in 1976 by Mine Consultant, Inc., indicated that about two-thirds of the surface layers that will be stripped and used for topsoil during reclamation are 20 inches or more thick. Using modern technology, it should be possible to salvage these soils.

3 The text has been changed.

4 The text has been changed.

5 The text has been changed.

2. - Director, U.S. Geological Survey, November 28, 1978

6 Page III-8, Wildlife - Suggest that a positive statement be made that antelope and sage grouse will be progressively displaced during active mining.

6 The text has been changed.

Sincerely,

Acting
Frank S. Dickson
State Conservationist

cc: Director, Office of Federal Activities, EPA (5 copies)
R. M. Davis, Administrator, SCS, Washington, D.C.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION VIII
FEDERAL OFFICE BUILDING
19TH AND STOUT STREETS
DENVER, COLORADO 80294

October 23, 1978

OFFICE OF THE
PRINCIPAL REGIONAL OFFICIAL

Mr. H. William Menard
Director
U. S. Geological Survey
National Center
Mail Stop 108
Reston, Virginia 22092

Dear Mr. Menard:

We wish to acknowledge receipt of your draft environmental impact statement on the mining and reclamation plan proposed by the Carter Mining Company for surface mining of coal at the Caballo mine in Campbell County, Wyoming.

1 We believe you have adequately addressed all aspects of the impacts expected to result from the proposed mining operations.

Sincerely yours,

Thomas E. Moore, P.E.
Director, ROFEC
Regional Environmental Officer

Responding to: Thomas E. Moore, P.E.
Director, ROFEC
Regional Environmental Officer
Department of Health, Education, and Welfare, Region VIII
Federal Office Building
19th and Stout Streets
Denver, Colorado 80294

1 Thank you for your comments.

U.S. DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
4015 Wilson Boulevard
Arlington, Virginia 22203

Dr. H. William Menard
Director
U. S. Geological Survey
National Center, Mail Stop 108
Reston, Virginia 22092

Dear Dr. Menard:

This is in response to Dr. Henry W. Coulter's letter of October 5, 1978, requesting our comments on the draft environmental statement concerning the proposed mining and reclamation plan for the Caballo Mine, Campbell County, Wyoming.

1 We have reviewed the statement and regard it to be satisfactory and adequate in scope. Inasmuch as the mining operations will conform with appropriate Federal and State safety and health requirements, we find no objections to the overall proposed plan.

Thank you for giving us the opportunity to provide these comments.

Sincerely,

Robert B. Lagather
Assistant Secretary for
Mine Safety and Health

Responding to: Robert B. Lagather
Assistant Secretary for
Mine Safety and Health
U.S. Department of Labor
Mine Safety and Health Administration
4015 Wilson Boulevard
Arlington, Virginia 22203

1 Thank you for your comments.

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS

BILLINGS AREA OFFICE
316 North 26th St.
BILLINGS, MONTANA 59101

IN REPLY REFER TO:
Environmental Quality
1102-01

Memorandum

To: Director
U.S. Geological Survey
National Center, Mail Stop 108
Reston, Virginia 22092

From: Office of the Area Director

Subject: Draft Environmental Statement, Proposed Mining and Reclamation Plan, Caballo Mine, Campbell County, Wyoming (DES 78/43)

1 The proposed project is remote from Indian lands within our jurisdiction and consequently we have not identified any adverse impacts to either the Indian people or their resources.

Area Director

Responding to: Mr. Jess Horn
Bureau of Indian Affairs
U.S. Department of the Interior
Billings Area Office
316 North 26th Street
Billings, Montana 59101

1 Thank you for your comments.

OFFICE OF THE DIRECTOR

United States Department of the Interior
BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

November 29, 1978

DES 78/43

Memorandum

To: Director, Geological Survey

From: Director, Bureau of Mines

Subject: Draft environmental statement, proposed mining and reclamation plan, Caballo Mine, Carter Mining Co., Campbell County, Wyoming

Potential mineral resources in the region other than coal include petroleum and natural gas, uranium, clinker or baked shale, and sand and gravel. Although 13 petroleum exploration wells in the lease area were dry holes, potential discovery is not ruled out. Further exploration can subsequently be carried out in mined-out areas.

1

Uranium has been found in the Wasatch and Fort Union Formations to the southwest but it has not been found to date in the same rocks in the lease area. Clinker and sand and gravel occurrences will be used in construction of the project but the balance will be lost by burial in the backfill. On a regional scale, this loss is considered insignificant.

Overall the statement appears to be concise but well done with the impacts on mineral resources adequately discussed. We appreciate the opportunity to review this document.

Director

Responding to: J. D. Morgan
U.S. Department of the Interior
Bureau of Mines
2401 E Street, N.W.
Washington, D.C. 20241

1 The text has been changed to incorporate your comments.

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

United States Department of the Interior

BUREAU OF RECLAMATION
Upper Missouri Region
P.O. Box 2553
Billings, Montana 59103

IN REPLY
REFER TO: 160
120.2

OCT 24 1978

Memorandum

To: Director, U.S. Geological Survey, Reston, Virginia

From: Regional Director, Bureau of Reclamation, Billings, Montana

Subject: Draft Environmental Statement, Proposed Mining and Reclamation Plan, Caballo Mine, Campbell County, Wyoming (DES 78-43)

The proposed mine should have no effects on projects of the Bureau of Reclamation.

1 Effects on water resources appear to be adequately addressed.

E. R. Wilde

E. R. Wilde

cc: Director, Office of Environmental Project Review, Office of the Secretary, Department of the Interior, Washington, D.C. 20240
Commissioner, Attention: 150

Responding to: E. R. Wilde
United States Department of the Interior
Bureau of Reclamation
Upper Missouri Region
P.O. Box 2553
Billings, Montana 59103

1 Thank you for your comments.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Billings Area Office
Federal Building, Room 3035
316 North 26th Street
Billings, Montana 59101

IN REPLY REFER TO:

ES

November 14, 1978

MEMORANDUM

TO : Director, U.S. Geological Survey, National Center, Mail Stop 108, Reston, VA 22092

FROM : Area Manager, USFWS, Billings, MT (ES)

SUBJECT: Draft EIS, Proposed Mining and Reclamation Plan, Caballo Mine, Campbell County, Wyoming (EC 78/44)

Following are the FWS comments on the subject draft.

Page I-15 - it is stated that the reclamation objective is to "produce a grassland. . . for livestock." On page I-19, it is stated that the lease requires reclaimed land to be capable of supporting all uses supported before mining. Reclamation to a grassland type will not be conducive to a
1 resumption of use by some of the species of wildlife existing on the area before mining. Also, the proposed post-mining use and reclamation plan, if implemented, would occur without prior specific "approval" of federal and state wildlife agencies. This appears to be contrary to the intent of Sections 780.15 and 816.133c(8) of proposed OSM regulations.

2 Page I-21 - under Wildlife, "Fish and Wildlife Restoration Act--16 USC 662," should read "Fish and Wildlife Coordination Act--16 USC 661."

3 Page II-23 - under Wildlife, the prairie falcon and black-tailed prairie dog are not on the federal or state threatened or endangered list.

4 Page II-25 - it is stated that most of the raptors referred to nest on or near the site; on page III-8, it is stated that no nest sites are known. These apparent contradictions should be resolved and clarified. It is incumbent on the applicant to determine if there are nests or not. Otherwise, the possibility exists that the company may eventually violate the Bald Eagle Act. If nests are found, the sites might conceivably be designated as unsuitable under the new unsuitability criteria.

5 Page III-8 - under Vegetation, last paragraph, the existing land use is described as "grazing." Wildlife use seems to be ignored. We believe wildlife occurrence also represents a significant use of the land. Under a section on Wildlife, impacts are casually dismissed as being insignificant

Responding to: Burton W. Rounds
Fish and Wildlife Service
United States Department of the Interior
Billings Area Office
Federal Building, Room 3035
316 North 26th Street
Billings, Montana 59101

Before mining can begin on the Federal leases, the mining and reclamation plan must be approved by the Office of Surface Mining as meeting the requirements of 30 CFR 700, including the sections you cite. Section 816.133(c) allows for approval of alternate land uses in consultation with the landowner. The Carter Mining Company owns or controls the surface of all the Federal leases and includes in the proposed mining and reclamation plan their intention to reclaim the land to grassland. Although the primary post-mining use will be grazing, the applicant does consider wildlife use in its reclamation plan. Shrubs, including
1 fourwing saltbush, Rosa, caragana, Russian olive, rabbitbrush, sagebrush, and winterfat, and ponderosa pine, are included in the revegetation plans to encourage wildlife use. DEQ approved seed mixtures, which result in a permanent, diverse, and effective vegetative cover will be used. Although the cover will be primarily for use by livestock, it will also, to some degree, support wildlife. Permanent surface water impoundments (approved by the DEQ) will provide resting, feeding, and breeding areas for waterfowl and a water supply for other terrestrial vertebrates (deer, antelope, etc.). Trees will be replanted along reclaimed water drainages to provide riparian wildlife habitat. The Carter Mining Company also has under active consideration a proposal by the U.S. Fish and Wildlife Service's office in Sheridan, Wyoming, to participate in a wildlife research program which would investigate the possibility of reclaiming mined lands for use by both livestock and certain wildlife (deer, antelope, etc.).

2 The text has been changed.

3 The text has been changed.

4 No nests of endangered species of raptors were found during environmental surveys. Text has been changed.

5 See response 1 above.

and unsupported statements are made (e.g., wildlife will reinhabit "within a few years.") Justification for this conclusion is not presented.

We support Alternatives F.2.a and b and F.3, as discussed on pages VIII-3, 4, 5, and 6. These provide for mitigation of wildlife impacts.

cc: Regional Director, USFWS, Denver, CO (ENV)
Coal Coordinator, Cheyenne, WY
FWS/ES/EC

United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

E30
DES 78-43

Memorandum

To: Director, U.S. Geological Survey

From: Director, Heritage Conservation and Recreation Service

Subject: Draft Environmental Statement, Proposed Mining and Reclamation Plan, Caballo Mine, Campbell County Wyoming

We have reviewed the subject document in accordance with your memorandum of October 5, 1978, and have the following comment.

1 We note from page II-27 that the Wyoming State Historic Preservation Officer was consulted regarding cultural resources at the mine site. The draft environmental statement did not contain the correspondence leading to this determination. We recommend that this correspondence be included in the final environmental statement.

for Chris Therral Delaporte

Responding to: Chris Therral Delaporte
United States Department of the Interior
Heritage Conservation and Recreation Service
Washington, D.C. 20240

1 Correspondence with the Wyoming State Historic Preservation Officer has been included; see Appendix A.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII
1860 LINCOLN STREET
DENVER, COLORADO 80295

DEC 1 1978
Ref: 8W-EE

Mr. William Radlinski
Director, U.S. Geological Survey
National Center, Mail Stop 108
Reston, Virginia 22092

Dear Mr. Radlinski:

The Region VIII Office of the Environmental Protection Agency has reviewed the draft environmental impact statement for the Proposed Mining and Reclamation Plan, Caballo Mine, Campbell County, Wyoming and offers the following comments for your consideration.

1. The DES contains no analysis with respect to expected compliance of the mining and reclamation plan for the Caballo Mine with regulations promulgated under the Surface Mining Control and Reclamation Act (i.e. 30 CFR 700 et. seq.). The Final Environmental Statement (FES) should evaluate the environmental impacts which result from a revised plan which substantively complies with these regulations.

2. The DES contains no analysis with respect to the presence of alluvial valley floors in the valleys of North Tisdale Creek, Tisdale Creek, and Gold Mine Draw. The FES should include information with respect to alluvial valley floor identification. If such areas are present on or near the Caballo Mine site, the presence and extent of farming and the essential hydrologic functions of such areas should be documented.

3. The air quality impact analysis is inadequate. There was no attempt to predict, through diffusion modeling the air quality impacts of the mine emissions upon ambient air quality. A complete analysis would address the impacts of the proposed mine as well as any existing mines. In December 1978 we expect to provide you with a copy of our policy on Best Available Control Technology and Best Management Practices for coal mining operations.

4. The FES should clearly spell out the location, extent, and associated effects of any excess spoil disposed of permanently outside the mined area.

5. Additional specific comments are contained in attachment No. 1

The use of a mining and reclamation plan that is not current and does not reflect existing federal regulations unfortunately appears to

Responding to: Alan Merson
Regional Administrator
Environmental Protection Agency
Region VIII
1860 Lincoln Street
Denver, Colorado 80295

1 It is noted on page I-1 that the mining and reclamation plan will have to meet the provisions of SMCRA (30 CFR 700 et seq.) before it can be approved. Meeting these requirements should lessen considerably the impacts described in chapter III. The complete revised mining and reclamation plan for the Caballo mine was submitted to Wyoming DEQ in August 1978; copies were submitted to OSM in December 1978. This plan is in the final review process by Wyoming DEQ as covered by the cooperative agreement between the State of Wyoming and the U.S. Department of the Interior (Federal Register, v. 44, no. 44, p. 12054, Monday, March 5, 1979). OSM anticipates preparing an environmental assessment (EA) of the potential of the proposed action to comply with SMCRA and will note the significant differences between the environmental impact of the plan described in the final EIS and the final plan submitted to OSM.

2 The unconsolidated stream-laid deposits along the drainages of the leasehold are generally less than 15 feet thick, and the streams are ephemeral. There is not sufficient water for either subirrigation or flood irrigation agricultural activities, and the only use of the land along the streams has been for undeveloped rangeland. A determination of the presence of alluvial valley floors has not yet been made by the regulatory authorities under SMCRA.

3 The section on Air Quality in chapter III has been revised. Compliance with BACT and BMP is required.

4 No spoil will be deposited outside the mined area. According to the mining plan, overburden from the initial boxcut will be used as engineered fill. All the rest of the overburden will be used for backfill in the mined out pit.

be part of an evolving pattern by the Department of Interior in their regional and site specific environmental impact statements for coal mining. We are greatly concerned about this pattern. We believe that such an approach is both a circumvention of the NEPA process because it deprives the decision-makers and the public of the opportunity to have a complete and meaningful review of the proposed action's impacts, alternatives, and mitigations, and imperils coal development in the
5 west by placing mine plan approval actions in danger of litigation. This approach does nothing to hasten the start of mining and may likely lead to unnecessary additional expense and delays in mining. We have expressed these concerns in a July 1978 letter to Mr. Guy Martin, Department of Interior and more recently in a letter to Mr. Strohbehn of the Council on Environmental Quality (see attachments Nos. 2 and 3). We hope that these concerns can be resolved and we will be glad to assist you in any way possible.

According to the procedures EPA has adopted to rate the adequacy of draft environmental impact statements, the draft EIS for the Proposed Mining and Reclamation Plan will be listed in the Federal Register in Category 3. This means that we believe that the draft EIS does not adequately assess the environmental impact of the proposed action. Normally, EPA policy would be to request that this EIS be reissued as a revised or supplemental draft EIS based on the deficiency of information. However, if the U.S. Geological Survey will require a revised mining plan from Carter Mining Company that complies with OSM regulations and can resolve the issues presented herein, perhaps the U.S. Geological Survey could accomplish such actions and immediately proceed to a final EIS.

We look forward to discussions with your EIS team to resolve the problems presented above and those items listed in our attached detailed comments. If you have any questions, contact Dennis Sohocki at (FTS 327-4831).

Sincerely yours,

Alan Merson

Alan Merson
Regional Administrator

Enclosures

5 See attached letter, dated December 19, 1978, from the Assistant Secretary for Land and Water Resources, DOI, to the Acting Director, Office of Federal Activities, EPA.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer To:
1792 (141)

DEC 19 1978

Mr. William D. Dickerson
Acting Director, Office of Federal
Activities (A-104)
Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Dear Mr. Dickerson:

This letter is in response to your concern that in the ongoing coal regional environmental statements (ES) the Department is evaluating mining and reclamation plans that are not in conformance with the Surface Mining Control and Reclamation Act (SMCRA) of 1977 (P.L. 95-87) and the intial regulations, 30 CFR 700 et seq. Your letter of July 6, 1978, raised this concern, as did the Region VIII Administrator's letters of October 17, 1978, commenting on the Final Southwest Wyoming Regional ES, and October 27, 1978, commenting on the Draft Southern Utah Regional ES. We also have received a preliminary draft letter from the Regional VIII Administrator's office concerning the Draft West-Central Colorado Regional Coal ES. However, to-date, we have not received official comments on the Colorado ES.

After the Department received the Environmental Protection Agency's comments of June 13, 1978, on the Southwest Wyoming Coal Regional ES, the Assistant Secretary for Energy and Minerals discussed this issue with the Region VIII Administrator's Office. The Department recognizes the concerns of EPA. However, we feel that an understanding had been reached that the ongoing regional ES's would proceed with the assessment of the mining and

reclamation plans as proposed. Each regional contains a caveat which says that the palns described in the ES will be revised in accordance with the Office of Surface Mining's (OSM) regulations and, when this is done, the mine plans will be reviewed for compliance by the Office of Surface Mining. The caveat also states that prior to approval of a revised plan, an updated environmental assessment will be done. If there have been significant changes in the environmental impacts of the proposed mining operation described in the regional ES from that submitted for approval to OSM, then a determination will be made as to whether a supplemental ES will be required to comply with the National Environmental Policy Act of 1969. This procedure will allow adequate evaluation and public review of mining and reclamation plans that have been brought into compliance with SMRCA.

In the Department's discussion with EPA Region VIII. it was understood that for future ES's that include mining and reclamation plan proposals, the plans would be up-to-date and in conformance with the SMCRA regulations. However, due to the fact that the ongoing regional ES's and the site-specific ES's included in them were well underway when SMCRA became law and the initial regulations were promulgated, the above described procedures would be followed only for these ES's. The Department has very tight time frames for these ES's. You should be aware that depending upon the status of a mining operation, each applicant will have to apply for a permit to mine on Federal lands either 2 months or 8 months after the Federal Lands Program regulations become effective. OSM is presently promulgating these regulations, and their proposed effective date is February 15, 1979.

The plans being analyzed in the regional ES's are being returned to the applicants for revision to include compliance with SMCRA and all other applicable requirements. The plans will not be approved by the Department until they conform to all applicable laws and regulations. In following these procedures, the Department believes that the environmental evaluation will be adequate and that public access to major environmental concerns will be provided. As a standard procedure, a notice is published in the Federal Register when each mining and reclamation plan is in the process of Departmental review. This notice also provides the public an opportunity to review and evaluate the plan.

For all future ES's the Department will review mining and reclamation plans that have been submitted to assure they comply with SMCRA before the ES's are started. Site-specific analyses will be based on plans that conform to SMCRA and all other applicable requirements. As with other requirements, the SMCRA regulations will be included as standards of performance and will be part of the proposed plans as they are evaluated.

We feel that these procedures respond to the concerns which EPA has raised. We would welcome discussing these procedures in further detail at your convenience.

Sincerely,

Guy R. Martin

Assistant Secretary for
Land and Water Resources

Identical letter sent to:
Mr. Alan Merson
Regional Administrator
Region VIII
Environmental Protection Agency
1860 Lincoln Street
Denver, Colorado 80295

Attachment No. 1

Specific Comments:

1. The emissions estimates do not include fugitive dust emissions from haul roads. Studies sponsored by this office have shown haul road emissions to represent more than half of the overall mining emissions. The study results also indicate a gross emission factor for particulates for a mine in Northern Wyoming to be about one pound per ton of coal. A mine producing 12 million tons of coal would then have emissions of 6,000 tons per year of particulates as compared to 1,344 tons which was estimated.

6

It seems improbable that an adequate impact assessment can be performed when the emissions are underestimated by such a large factor.

7 2. (page I-9) The DES mentions the utilization of a mine dewatering well. What will be the ultimate disposition of water from this well?

8 3. (page I-3) What specific plans does Carter Mining Company have for reestablishing the Tisdale Creek drainages over the west and northwest highwalls (especially in terms of long term stability)?

9 4. (page I-13) What bulking factor was used in developing the post-mining topographic map shown in Figure I-4?

10 5. (page III-4) In addition to the data cited for the example in Montana, ground water quality changes at existing mine sites in northwestern Wyoming (e.g., Belle Ayr South and Wyodak) should be included in the FES.

11 6. (page III-3) Chapter II mentions an alluvial ground water system. Chapter III should discuss probable impacts to this system.

12 7. (page IV-1) The FES should contain specific mitigating measures (in addition to the socio-economic mitigating measures included in the DES) which relate to special measures which will be required by the Department (e.g., Best Available Control Technology for fugitive dust control, special protection provisions for identified alluvial valley floors, busses for transporting workers, irrigation requirements, etc.). Rather than treating such measures as alternatives in Chapter VIII, they should be addressed in Chapter IV of the EIS.

13 8. (page V-1) Chapter V of the FES should address potential increased sediment loads off-site and probable stability problems in the post-mining drainage system. In addition, the available water supply depth should be evaluated in terms of post-mining uses.

6 The section on Air Quality impacts has been revised.

7 The water from the mine dewatering well will be used for dust suppression on the haul roads and thus return to the local hydrologic regime.

8 No highwalls are included in the Caballo mining and reclamation plan. Postmining drainage will be reestablished in accordance with applicable Federal and State regulations.

9 A 20 percent bulking factor was used.

10 Ground water data from nearby active mines is on file with the Wyoming Department of Environmental Quality, Water Quality Division, Cheyenne, Wyoming.

11 The discussion of stream-channel sands on page II-11 has been revised.

12 All mitigating measures required by law are included in the chapter on mitigation rather than in the chapter on alternatives. Chapters IV and VIII have been revised accordingly.

13 The discussion on water in chapter V has been revised.

14 9. (page VII-6) EPA supports the utilization of busses to transport employees to and from the Caballo Mine (Alternative F.4).

15 10. (page VIII-8) EPA is in the process of finalizing a fugitive dust policy for surface mining activities. This policy will contain a more definitive set of best available control technologies and best management practices for fugitive dust control. The Caballo Mine will be subject to this policy under EPA's Prevention of Significant Deterioration regulations under the Clean Air Act Amendments.

14 No reply needed.

15 The applicant has a new source construction permit approved by Wyoming DEQ and by EPA. The mining and reclamation plan for the Caballo mine will have to meet the requirements of all laws and regulations, including SMCRA, OSM, and EPA's Prevention of Significant Deterioration, before mining can start on the Federal leases.

CITY OF GILLETTE — CAMPBELL COUNTY

Department of Planning and Development

P.O. BOX 3003 GILLETTE, WYOMING 82716 PHONE (307) 686-2222

December 7, 1978

E.G.A. Weed, Task Force Leader
Mail Stop 760
U.S. Geological Survey
Reston, Virginia 22092

Re: Draft Environmental Statement, Caballo Mine, Campbell County, Wyoming - DES 78-43

Dear Mr. Weed,

1 It is apparent by now that there will not be a public hearing in Gillette on the draft environmental statement for the Caballo Mine. The City of Gillette has formally requested in the past that all environmental statements be subject to local public hearing to provide a legitimate opportunity for comment from the public and for a dialogue between local officials and citizens and those preparing the statement. After hearings on the East Gillette Mine and on the Pronghorn Mine we assumed this had become a policy of the Department of Interior.

This letter is being sent as a formal protest that no local public hearing was held on this statement. We hope that officials of the federal government will reconsider their apparent decision to discontinue local public hearings.

2 Also, we have had very bad experiences in the past relative to the inclusion of our written comments in final environmental impact statements as well as obtaining any reasonable response to the inquiries in our written comments. We believe it would be much more constructive for those preparing the statement, especially the socio-economic sections, to work directly with local officials to confirm and/or modify socio-economic data and projections and to examine potential mitigations.

The City of Gillette has been very active over the past few years in the review of permit applications at both the state and federal level. We have commented both on site-specific environmental statements as well as proposing general measures to improve the environmental impact statement process. The impact statement for the Pronghorn Mine was the first vague evidence that the process was being improved. Our major suggestion

Responding to: Joseph A. Racine, Director
City of Gillette-Campbell County
Department of Planning and Development
P.O. Box 3003
Gillette, Wyoming 82716

1 Public hearings were not held on the draft statement because of apparent lack of public interest and attendance at recent hearings on similar mining proposals in the same general area.

2 The Geological Survey believes that meetings with local officials and public meetings held in conjunction with local communities are preferable to formal public hearings. Procedures for holding such meetings are under study. The advice of the city of Gillette will be sought in the development of such procedures.

3 in the past has been that draft impact statements examine not only impacts of proposed mining and reclamation plans but also examine potential mitigating measures which might be implemented by mining companies, local government, state government as well as the federal government itself. In this way there could be some substantive output from the NEPA process in the form of specific proposed mitigations which could be implemented along with the development of the industrial facility. In this way mining companies could, in fact, make proposals on their willingness to work with the community in related areas.

4 We recognize that these comments are being forwarded after the December 1, 1978 deadline. However, we hope that they will be given due consideration in the preparation of the final environmental statement. Also, we invite those involved in the preparation of the final statement to visit Gillette and/or contact me directly if you wish to obtain detailed local input into the content of the statement.

5 We do have a question regarding this particular coal mine which is being considered under the NEPA process after its facilities are already constructed. We understand that the facilities construction was not a federal action however, it is difficult to believe that any significant requirements could be placed on such a facility after the large investment has already been made. I don't believe that mining companies are ordinarily in the practice of investing many millions of dollars in facilities without some assurance that they will be able to mine coal. It would seem more logical that this process would have taken place prior to construction.

Generally I found the statement to be a considerable improvement over the statements in years past. We also do appreciate the fact that the report by Gladstone Associates, the only intensive, locally developed economic base analysis to date, was used in the preparation of the socio-economic impact section of the document. Please be advised that Gladstone Associates is presently under contract with Gillette and Campbell County to update the 1976 report. This updated information will be available early next year to interested parties.

We will be available to provide technical assistance to you and your staff in the preparation of the final document if you wish. Please don't hesitate to contact me directly if you have any questions or comments.

Very truly yours,

Joseph A. Racine
Director

JAR/lgw
cc/ The Honorable Michael B. Enzi
Senator Malcolm Wallop
Senator-elect Allan Simpson
The Honorable Richard Cheney

3 Measures to mitigate some of the impacts are discussed in chapter IV. In addition, alternative E in chapter VIII would have a mitigating effect. Further mitigation will occur when the mining and reclamation plan is modified to meet the provisions of the Office of Surface Mining.

4 The Central Region Coordinator and three task force leaders from the USGS Branch of Environmental Impact Statement Preparation met with Mr. Racine on January 31, 1979, in Gillette, Wyoming, to discuss EIS preparation.

5 Construction of mine facilities and mining of coal at Caballo mine is on land covered by State of Wyoming permit No. 433 and involves private fee coal of the Carter Mining Company. The Federal Government had no involvement with that land and coal until passage of SMCRA, after the State permit had been issued. State processes have been met; State permit No. 433 was approved June 21, 1976, allowing Carter to mine State and private fee coal (see map 1) and to construct processing facilities for these proposed operations.

DANIEL N. MILLER, JR.
DIRECTOR AND
STATE GEOLOGIST
DEPUTY DIRECTOR AND
STAFF GEOLOGIST
GARY B. GLASS
STAFF GEOLOGISTS
RODNEY H. DE BRUIN
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THE GEOLOGICAL SURVEY OF WYOMING
UNIVERSITY OF WYOMING
BOX 3008, UNIVERSITY STATION
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TO: State Planning Coordinator
Wyoming State Clearinghouse
2320 Capitol Avenue
Cheyenne, WY 82002

FROM: Gary B. Glass, Deputy Director/Coal Specialist
Geological Survey of Wyoming

DATE: October 24, 1978

SUBJECT: COMMENTS ON DES 78-43 (CABALLO MINE) (STATE IDENTIFIER 78-124D)

1 The Caballo mine commenced operation in October 1978, evidently on the private lands in Section 24. Because of this, the mining plan described in the DES has been advanced. The final EIS should at least discuss these rather unique events and their effect on the proposed mining and reclamation plan.

2 It would be helpful if market contracts for the Caballo mine production were included in the EIS. Knowledge of these contracts is important in evaluating the consequences of the alternative decisions that may be made for this mine as well as other mines in the Powder River Basin.

Responding to: Gary B. Glass, Deputy Director/Coal Specialist
Geological Survey of Wyoming
University of Wyoming
Box 3008, University Station
Laramie, Wyoming 82071

1 See response 5, preceding comment.

2 Coal from the Caballo mine is all contracted for domestic steam coal and is to be used in the States of Nebraska, Kansas, Wyoming, and possibly others; see chapter I, section A.

STATE OF MONTANA

DEPARTMENT OF FISH AND GAME

Helena, MT 59601
October 20, 1978

Director, U. S. Geological Survey
National Center, Mail Stop 108
Reston, Virginia 22092

RE: Draft EIS, Proposed Mining and Reclamation Plan, Caballo Mine, Campbell County, Wyoming

Dear Sir:

1 I have completed a review of the wildlife, vegetation, and reclamation sections of the Draft EIS for the Caballo Mine. Compared to many other recent EIS's, these particular sections of this draft EIS are very weak. While there is a vegetation map included, there is no quantification of vegetation types on the area. Since the reclamation section seems to propose the reestablishment of a monotype grassland for the expressed purpose of cattle grazing, perhaps quantitative data on vegetative diversity are not necessary.

2 The wildlife section of the report is very superficial, with little or no attempt at quantification. The wildlife portion of the chapter on "Impacts" is very misleading, and in my way of thinking, unacceptable. It intimates that there will be little impact on wildlife because of the surrounding regional populations. However, if one looks at the map of present and proposed regional mining developments (page I-4) it is obvious that there are many other developments that will affect wildlife. These incremental effects will add up to a major disruption of
3 wildlife populations. Also, the proposed reclamation plan is apparently aimed at restoring the area for cattle grazing, with no apparent consideration for wildlife. If this is indeed the case, a resultant lack of vegetative diversity will be anything but conducive to the reestablishment of wildlife on the area. Species requiring brushy areas, particularly sagebrush, will be impacted the most. They will not "...reinhabit reclaimed areas at about present levels within a few years." as stated on page III-8. If far-out statements such as this are to be included in the EIS, they should be substantiated with literature citations.

It is my opinion that the above discussed sections of the Draft EIS should be reworked. Thank you for the opportunity to review this document.

Sincerely,

Robert R. Martinka

Robert R. Martinka, Chief
Baseline Studies Bureau

RRM/sd

Responding to: Robert R. Martinka, Chief
Baseline Studies Bureau
State of Montana
Department of Fish and Game
Helena, Montana 59601

1 A new vegetation map has been furnished by the applicant; see map 4.

2 Field studies of the vegetation and wildlife on the Caballo minesite have been made by the University of Wyoming and are with the applicant's Caballo mining and reclamation plan on file with the regulatory authorities.

3 Regional impacts including cummulative effects of wildlife displacement are discussed in "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979).

Scott M. Matheson
Governor

Kent Briggs
State Planning Coordinator

STATE OF UTAH
Office of the
STATE PLANNING COORDINATOR
118 State Capitol
Salt Lake City, Utah 84114
(801) 533-5245

November 2, 1978

The Director
U. S. Geological Survey
National Center
Mail Stop 108
Reston, Virginia 22092

Dear Sir:

1 The Utah State Environmental Coordinating Committee has reviewed the Draft Environmental Impact Statement for Caballo Mine, Campbell County, Wyoming. The Committee offers no comment.

Thank you for the opportunity to comment.

Sincerely,

Lorayne Tempest

Lorayne Tempest
Assistant State Planning Coordinator

LT:jb

Responding to: Lorayne Tempest
Assistant State Planning Coordinator
State of Utah
Office of the State Planning Coordinator
118 State Capitol
Salt Lake City, Utah 84114

1 Thank you for your comments.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming Department of Agriculture

TELEPHONE: (307) 777-7321 CHEYENNE, WYOMING 82002

LARRY J. BOURRET, COMMISSIONER

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DR. HAROLD TUMA, DEAN
COLLEGE OF AGRICULTURE
UNIVERSITY OF WYOMING, LARAMIE

M E M O R A N D U M

DATE: November 17, 1978

TO: State Planning Coordinator

FROM: Don Daiss, Assistant Commissioner
and Liaison Officer for E.I.S. Review

SUBJECT: Caballo Mine, Campbell County, Wyoming
Proposed Mining and Reclamation Plan
State Identifier Number 78-124D

Attached are the comments of the State Conservation Commission, which the Wyoming Department of Agriculture endorses fully.

We continue to find agriculture taking a back seat, although we concede energy is a very important industry.

1 After we mine the energy, most of these lands will be returned to providing food and fiber for a growing population. Therefore, we believe that more detail should be shown in this draft concerning returning the land to "better than before"; i.e., variety of grass seed, ability to irrigate, etc.

We appreciate the opportunity to comment.

DDjh

Interagency

Responding to: Don Daiss, Assistant Commissioner
Liaison Officer for E.I.S. Review
Wyoming Department of Agriculture
Cheyenne, Wyoming 82002

1 A diverse, effective, and permanent vegetation cover, which is for the most part native to the area and is approved by the DEQ, will be reestablished as soon as practical after mining a particular area. Fourteen species of seed will be used in mixtures adapted for eight soil types. There is not sufficient water available for irrigation. However, some indications are that the normal amount of rainfall for the area is sufficient to obtain successful growth. See also response to U.S. Fish and Wildlife Service.

STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Economic Planning and Development

BARRETT BUILDING CHEYENNE, WYOMING 82002 PHONE (307) 777-7284

JOHN NILAND
EXECUTIVE DIRECTOR

MEMORANDUM

TO: Dick Hartman

FROM: Mike Reese

DATE: October 23, 1978

SUBJ: 78-124DY

Attached are Sharron Kelsey's comments regarding the proposed mining and reclamation plan for Caballo Mine, Campbell County, Wyoming.

MEMORANDUM

TO: Mike Reese

FROM: Sharron Kelsey

DATE: October 23, 1978

SUBJ: Proposed Mining and Reclamation Plan for Caballo Mine

1 For the most part, negative and positive impacts are well-documented. However, the Socioeconomic section neglects any analysis of housing needs. The discussion of mitigation of negative impacts does not seem to address the problems in any real sense. Actually, it seems to be the same discussion we have seen in other EIS documents lately. The attitude of the document is also similar, e.g. the project will cause significant environmental, social and economic impacts, but "so what" - it's only part of the
2 development going on. The document attaches little importance to the displacement and distruction of the wildlife on the site, or the $3.4 million that Gillette will spend providing services to the required work force.

3 Any recommendation of approval should include stringent conditions for the preservation of wildlife and some commitment to mitigation of socioeconomic impacts.

Responding to: Sharron Kelsey
Wyoming Department of Economic
Planning and Development
Cheyenne, Wyoming 82002

1 The socioeconomic impacts of the Caballo mine, spread over a wide area (at least from Wright to Gillette, and possibly to Moorcroft), are inextricably intermeshed with those from the other energy-related developments in the area. It is practically impossible to attribute any single impact exclusively to one mine. Housing, particularly low- and medium-priced housing, is in very short supply in the area, and each influx of new workers will intensify the problem.

2 "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979) discusses the socioeconomic situation of the region in considerable detail, including the financial plight of Gillette in providing services to all the people moving into the city.

3 See also the discussion of socioeconomics in the comments from the Carter Mining Company.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

SOLID WASTE MANAGEMENT

HATHAWAY BUILDING

CHEYENNE, WYOMING 82002

TELEPHONE 307-777-7752

MEMORANDUM

TO: ROBERT E. SUNDIN

FROM: CHARLES A. PORTER

DATE: NOVEMBER 28, 1978

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
CARTER MINING CO.-CABALLO MINE

Responding to: Charles A. Porter
Wyoming Department of Environmental Quality
Solid Waste Management
Cheyenne, Wyoming 82002

1 The above referenced Impact Statement does not address the subject of solid waste disposal. The Carter Mining Company has made application for and received a permit for solid waste disposal. We do, however, feel that the fact that a permit is required for solid waste disposal should be addressed in the Statement.

1 The text has been revised to show that the applicant has secured a permit for solid waste disposal.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Department of Environmental Quality

Water Quality Division

HATHAWAY BUILDING CHEYENNE, WYOMING 82002 TELEPHONE 307 777-7781

M E M O R A N D U M

TO: Robert E. Sundin

THROUGH: William Garland

FROM: A. J. Mancini

SUBJECT: Comments on draft ES, Proposed Mining & Reclamation Plan, Caballo Mine, Campbell County, Wyoming.

DATE: November 17, 1978

As with most other mines of the same or similar nature, there are several general areas of concern to the Water Quality Division:

1. One or more settling and/or sedimentation ponds will be constructed. The operator should apply to the Division (or Department) for authorization to construct each pond. The authorization to construct must be received for each pond before pond construction starts.

2. Dewatering may require an NPDES permit. The operator should ascertain whether or not an NPDES permit will be required for his particular operation by providing the necessary details to the Division.

1 3. A permit for the construction of the septic system must be obtained from the Division or Department, before construction starts.

On page I-20, Section 5, "Water Resources", is not up-to-date with respect to laws and regulations concerning water-quality standards: the FWPCA was further amended in 1977, and any cited regulations should include Wyoming Water Quality Rules and Regulations Chapter 1, "Quality Standards For Wyoming Surface Waters". The water quality standards for interstate water in Wyoming were required by the FWPCA. The significance of including this separately in the ES escapes me.

On page I-17, under C. "Legal Requirements for Protecting the Environment", it is stated that engineering design procedures include surface water impoundments that meet Wyoming State Engineer's criteria and applicable MSHA criteria; if this includes water treatment, then criteria of the Wyoming DEQ must also be met. Also, the meaning of "MSHA" is unknown.

Waste material disposal is regulated and administered by the Wyoming DEQ (page I-17).

Responding to: A. J. Mancini
Wyoming Department of Environmental Quality
Water Quality Division
Cheyenne, Wyoming 82002

1 The applicant has submitted a revised mining and reclamation plan to the Wyoming Department of Environmental Quality and has obtained the required permits.

Premining Water Quality. The overall quality of the shallow ground water sources in Campbell County is generally of marginal to poor quality. In most samples the concentration of both sulfate and total dissolved solids exceeds the maximum concentrations recommended by the U.S. Public Health Service for domestic or municipal use (250 and 500 mg/L respectively). The ground water sampled from the Caballo mine prior to mining is of marginal to poor quality. It is primarily the calcium sulfate type, with local sodium bicarbonate types in all hydrogeologic units, except the clinker, which contains the calcium sulfate type in all samples collected. The two types of water appear to be distinct at the Caballo mine. Commonly, those samples with the highest concentration of total dissolved solids are of the calcium sulfate type.

Postmining Water Quality. Under the existing DEQ NPDES water discharge permit, the quality of any discharge into streams must not exceed two parameters: 30 mg/L of total suspended solids (daily maximum concentration) and 10 mg/L of oil and grease (instantaneous concentration). No problems are anticipated in meeting these effluent limitations.

Experience of other mines in the Powder River Basin (Belle Ayr and Decker) indicates that long-term water quality impacts will probably be minimal and limited to those aquifers within the permit area.

WYOMING
EXECUTIVE DEPARTMENT
CHEYENNE

EO HERSCHLER
GOVERNOR

December 27, 1978

Director, U.S. Geological Survey
National Center
Mail Stop 108
Reston, Virginia 22092

Re: Caballo Mine

Dear Sir:

1 We have completed our review of the above mentioned environmental statement. Comments received from the state agencies are enclosed.

Thank you for providing an opportunity to review the statement. Please keep us informed of the progress of this effort.

Our apologies for the delay of these comments.

Sincerely,

State Planning Coordinator's Office

CO:mee
Enclosures

Responding to: State Planning Coordinator's Office
Wyoming Executive Department
Cheyenne, Wyoming 82002

1 Thank you for forwarding the comments from the State agencies.

WYOMING
EXECUTIVE DEPARTMENT
CHEYENNE

ED HERSCHLER
GOVERNOR

March 8, 1979

Director, U.S. Geological Survey
National Center
Mail Stop 108
Reston, Virginia 22092

Re: Caballo Mine

Dear Sir:

1 Enclosed are additional comments received in our office for your consideration.

We regret the delay of these comments however, it appears that they may have been misplaced for some time.

Sincerely,

State Planning Coordinator's Office

CO:mee

Responding to: State Planning Coordinator's Office
Wyoming Executive Department
Cheyenne, Wyoming 82002

1 Thank you for forwarding the comments from the State agencies.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Game and Fish Department

CHEYENNE, WYOMING 82002

EARL M. THOMAS
DIRECTOR

November 29, 1978

EIS #126
DES Caballo Mine

VIA AIR MAIL

Mr. H. William Menard, Director
U. S. Geological Survey
National Center
Mail Stop 108
Reston, Virginia 22092

Dear Mr. Menard:

We have reviewed the Draft Environmental Statement for the Proposed Mining and Reclamation Plan being considered for the Caballo Mine in Campbell County, Wyoming on Federal coal leases W-3397 and W-49644. We offer the following comments and recommendations in the interest of the wildlife resource.

CHAPTER I - Description of the Federal Action

B. Proposed Mining and Reclamation Plan

3. Mining (pages I-9 thru I-12)

1 We recommend that soil not be stockpiled for more than a few months. However, should longer stockpiling be absolutely necessary, plant species for temporary stabilization should be selected on the basis of their vigor in establishment and their lack of persistence. Many species, such as crested wheatgrass, used often for temporary stabilization, are undesirable as permanent cover. Hence, seeds of such species should not be introduced onto reclaimed areas via stockpiled topsoil.

4. Reclamation (pages I-12 thru I-15)

2 The minesite is classified as winter/yearlong range for antelope and yearlong range for mule deer. It supports a number of wildlife species in addition to these. To reclaim this area for livestock grazing only will have extremely serious, adverse impacts on indigenous fauna. The applicant will, in addition, be in obvious violation of the new strip mining regulations, since the proposed reclamation plan will result in a change in land use from livestock grazing and wildlife habitat to livestock grazing only.

3 Further clarification is needed in reference to the proposed timetable for reclamation. The statement, "All efforts will be made to reclaim the replaced spoils as promptly as possible" is inadequate.

Responding to: W. Donald Dexter
Assistant Director, Operations
Wyoming Game and Fish Department
Cheyenne, Wyoming 80002

1 The applicant intends to observe stockpiling methods in conformance with the regulations of DEQ, State of Wyoming, and OSM.

2 The applicant has submitted to the State of Wyoming a revised mining and reclamation plan in conformance with OSM requirements. This plan is in the final review process by Wyoming DEQ as covered by the cooperative agreement between the State of Wyoming and the U.S. Department of the Interior (Federal Register, v. 44, no. 44, p. 12054, Monday, March 5, 1979).

3 Backfill emplacement will begin as soon as space exists for manuevering required equipment in the pit. This will be followed in sequence by soil preparation and seeding in accordance with regulations.

b. Seedings (page I-14, I-15)

No information is presented regarding vegetation species to be reseeded.

4 The species to be reseeded on reclaimed areas should be listed with proposed seeding rates and estimated percentage of vegetative composition and total ground cover over time. A quantitative comparison should be made between the pre-mining and post-mining vegetative communities.

5 If the post-mining environment is to be of any value to wildlife, and we believe it should be, then to "produce a grassland vegetation for livestock that equals or exceeds the amount on undisturbed native range" is inadequate. The productivity of a site is not an index of its value to wildlife. The concept that should be addressed is vegetative diversity. The more vegetatively diverse a site is, the greater its value to most wildlife species.

5. Health and Safety (page I-15)

6 Fence designs along roads, around the minesite, and along the railroad spur should conform to Wyoming Game and Fish Department guidelines for fencing on deer and antelope range.

6. Monitoring Program

d. Vegetation and Wildlife (page I-17)

7 A schedule for vegetation and wildlife population sampling should be included. Techniques to be used in sampling should be discussed.

CHAPTER II - Description of the Environment

D. Water Resources

1. Ground Water (pages II-9 thru II-14)

8 The general description of Wasatch aquifers on page II-11 indicates that ground water moves west and south to discharge into Caballo Creek. The contribution of ground water to Caballo Creek should be quantified.

2. Surface Water (pages II-14 thru II-17)

9 Streamflow data from upper Tisdale Creek should have been collected and presented here. It should be noted, within the context of this discussion, that the reliability of one year's streamflow data in calculating long-term mean discharge, maximum flows, etc. must be subject to some question. The importance of aquifers to Caballo Creek should be considered, and the impacts of the proposed action should be quantified.

4 Vegetative studies prepared for the Caballo leasehold are on file with the regulatory authorities.

5 Use of a diversity of seed species including those that support wildlife is planned by the applicant.

6 The applicant intends to install fencing that meets applicable Federal and State regulations.

7 The applicant will monitor vegetation and wildlife in accordance with Federal and State requirements, and is currently developing plans for special studies with the Fish and Wildlife Service.

8 It is not certain that water in the Wasatch does flow into Caballo Creek, which has no base flow in this area. However, assuming an average transmissivity of 6,500 gal/day/ft (from an aquifer at the Belle Ayr mine), on average gradient of 50 feet per mile, and a width of 5 miles, the ground-water flow from the Wasatch aquifer under the Caballo leasehold south into the Belle Ayr leasehold would be about 1.6 million gallons per day. Some of this flow will be intercepted by the open pit at Caballo mine. However, because only a small part of the leasehold will be mined at any one time, no noticeable effect on flow in and along Caballo Creek is expected.

9 A statement regarding the reliability has been added to the text.

F. Vegetation (page II-23)

Quantitative data is completely absent from this section. The density, dominance, and frequency of vegetative species in each community on the site should be described. This is particularly important for comparison of the pre-mining and post-mining environments.

10 G. Wildlife (pages II-23 thru II-25)

A complete list of all vertebrates observed or thought to occur on the site should be presented.

Additional quantitative wildlife information should be presented, preferably by habitat type. Habitat affinity data should have considerable bearing on reclamation plans.

According to the most recent available data, the prairie falcon (Falco mexicanus),
11 is not classed as an endangered species by the U. S. Department of the Interior. This species is common within the State of Wyoming. State-listed rare species which may occur on the leasehold should be documented here.

It would be extremely helpful to the reader if "data collected by the University of Wyoming", referred to in this section, were appended or a reference cited. It would be desirable to have quantitative data available, rather than the qualitative statements presented here. Similarly, techniques used to collect this data should be presented, as well as the Department of the University which conducted the research.

Recently collected (August, 1978) pre-hunt data indicate approximately 15 antelope
12 per square mile in this area. It is likely that this increases during the winter to around 20 antelope per square mile.

We question the validity of data which claims that only occasional mule deer sightings were made in this area, which is classed as yearlong range for mule deer.

Population estimates and habitat affinity information should have been presented for all mammalian predators occurring on the leasehold.

We question the validity of the estimated "less than one animal per section" for white-tailed jackrabbits. No density estimate is given for black-tailed jackrabbits.

Quantitative density and habitat affinity data should be presented for rodent species. If three summers of data have been collected, certainly the results merit presentation in the DES.

Quantitative estimates of nesting populations of mourning doves, waterfowl, and non-game shorebirds should have been presented. A reference should accompany the statement, "There is approximately one nesting pair per waterhole."

10 See response 4 above.

11 The text has been changed.

12 This material included studies over three years and was submitted in detail with the mining and reclamation plan; see response 4 above.

Quantitative data on raptors are not presented. Numbers of raptors, number and location of nests, and habitat affinity data should be presented in the DES.

12 What is the source of the "recent census" data showing 2.4 songbirds per acre? Is this a nesting population estimate? The comment is made that "Food and nesting habitat, territorial behavior, and vegetative characteristics vary enough to support a considerable diversity of birds." Yet only five songbird species are listed. If so there must be more than five species on the site. Breeding bird census data and habitat affinity information should be presented here.

Do other species of reptiles or any amphibians occur on the lease?

H. Land Use (page II-25)

This DES fails to recognize wildlife habitat as a legitimate and important use of the lease. Failure to recognize existing land use could result in poorly-directed
13 reclamation, thus limiting future wildlife use of the mined area. Reestablishment of wildlife habitat following mining is a necessity if wildlife populations are to exist in the future.

K. Recreation (page II-26)

There is no mention here of the severe limitation of outdoor recreation in
14 Campbell County due to the scarcity of public land. What percentage of the land in the county is accessible to the public?

CHAPTER III - Probable Impacts of the Proposed Action

A. Topography (page III-1)

The effects of changes in topography on vegetation and wildlife have not been discussed. The topographically diverse pre-mining environment has given rise to a similarly diverse flora and fauna on the leasehold. The loss of this topographic
15 diversity will undoubtedly be accompanied by permanent losses within the biota. The proposed post-mining land use including only cattle grazing is unacceptable because it does not reflect current land use.

B. Geology and Mineral Resources-Relationships (page III-2)

Paragraph 2 indicates that water yeilds to wells may not return to pre-mining
16 levels. The DES says this will result in little impact because there are other water sources. This may be so for wells; however, the impacts on surface waters (both in Caballo Creek and downstream areas) should be addressed.

C. Soils (page III-3)

Some estimate should be given of the timespan necessary for the redevelopment
17 of soils. If these soils do have significantly different characteristics than existing soils, reclamation should take these differences into account. If these

13 The applicant intends to meet all applicable requirements of DEQ, State of Wyoming.

14 Recreation resources for the area are discussed in "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming (FES 79-17, April 1979).

15 The impact of loss of topographic diversity has been added.

16 This comment appears to refer to DES page III-4. According to Marlin Lowry (U.S. Geological Survey, Hydrologist, Water Resources Division, Cheyenne, oral communication, January 17, 1979), water from the Wasatch aquifer does not flow into Caballo Creek. This statement is based on the lack of baseflow in the stream, which is dry nearly 50 percent of the time where it joins the Belle Fourche.

17 Time required for new soils to develop varies depending on available material, climate, and hydrology of the individual area. After reclamation the soils will support cattle grazing. Soils data for the Caballo minesite will become available as reclamation progresses in the area. Text has been revised.

17 soils limit revegetation, then the impacts on post-mining use could be extremely serious. The assurance that they "will probably support...cattle grazing" is insufficient.

Again, it should be noted that the post-mining use of this land should include wildlife habitat.

D. Water Resources

2. Surface Water (page III-4)

18 Only 11 reservoirs are shown in Figure I-4 (page I-13) for replacement of the "approximately 20" to be lost during mining. This will represent a serious habitat loss to waterfowl and shorebirds on the leasehold. The number of waterholes on the site after mining should be the same as the number present before mining. If adequate water quantity and quality are available, replacement ponds should be designed to support fisheries.

F. Vegetation (page III-8)

Impacts to vegetation will probably be very serious, though it is difficult to completely assess them due to the lack of pre-mining vegetation data and the complete absence of data on proposed post-mining vegetation.

19 If existing vegetation is replaced by a grassland monotype, as is implied in Chapter I, then serious impacts on wildlife will be unavoidable. It is unacceptable for 40 years to elaspe before wildlife habitat is reestablished.

Vegetative composition on reclaimed lands should be dictated by all land uses including wildlife habitat.

G. Wildlife (pages III-8, III-9)

Impacts to wildlife will be major. Rationalizing the permanent loss of wild-
20 life by stating that they are "but a small fraction of regional populations" is not acceptable. The cumulative effect of many such "small" losses is a permanent, major loss of the wildlife resource. The state now manages herds of animals. The impact on the herd should be determined.

Small mammals and birds will <u>not</u> "reinhabit reclaimed areas at about present
21 levels within a few years." Populations of songbirds and small mammals often exist at or near carrying capacity. The displacement of individuals from the leasehold will mean their loss until the carrying capacity of the leasehold is re-established. A quantitative estimate of this loss should be presented here. Since no habitat will be replaced, these species are unlikely to return to the area.

22 No quantification of the losses to shorebirds are given. We fail to see why the loss of reptile populations is linked with stockpond habitat loss. Amphibians, not reptiles, are dependent on a semi-aquatic environment.

18 Permanent surface water impoundments will be left after mining which will be beneficial for the approved post-mining land use (livestock grazing) and for wildlife. They will be designed and constructed to meet the appropriate DEQ regulations for slope, contour, access, revegetation, stability, etc. The 20 small stock ponds currently in use will be replaced by 11 ponds having a total capacity approximately equal to that of the 20 premining ponds. The new ponds will be constructed as close as possible to the location of the existing ponds.

19 Diverse species of seed will be used for reclamation by the applicant.

20 Analysis of regional impacts is discussed in "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979).

21 Wildlife habit is expected to become reestablished gradually.

22 Text has been changed.

On page II-25, raptor nesting is said to occur on the leasehold, yet on page III-8, it states that "no raptor nesting sites are known to occur." We 23 believe that raptor nesting does occur on the leasehold, and thus, impacts to raptors will be more than "minimal." The impact will be unknown until raptor nesting populations are quantified.

24 The effects of the proposed action on mule deer have not been mentioned.

The effect of losing approximately 6,700 acres of winter/yearlong range through direct disturbance and unknown additional mortality such as hindrance of 25 movements, illegal kills and road kills will be significantly more than a loss of 100 antelope.

The effect of the proposed action on sage grouse is dependent on revegetation. If suitable habitat, with emphasis on big sagebrush (Artemisia tridentata) is successfully and promptly re-established, sage grouse may reinhabit the area. If it is not, the loss of sage grouse will be permanent.

26 Impacts to predators on the leasehold have been seriously underestimated. The impacts on prey species (small mammals, birds, and invertebrates) will largely determine the impacts on predators. If these species experience serious losses, so will predators. Such losses can be expected if re-vegetation for wildlife is not successful.

No mention is made here of the fact that the Wyoming Game and Fish Department 27 received damage claims in 1976 and 1977 from the Czapla Ranch on the north edge of this property. Mining activity will reduce available habitat and intensify this damage problem.

28 No impacts on species which are officially classified as "rare" in Wyoming are included.

29 No impacts of the proposed railroad spur or powerline are included.

H. Land Use (page III-9)

Unless the existing land use of wildlife habitat is recognized, the proposed 30 action will have extremely significant effects on land use. The present use of this land is wildlife habitat and livestock grazing. It should be reclaimed for those uses.

CHAPTER V - Probable Adverse Environmental Impacts...(pages V-1, V-2)

31 Expected losses in soil productivity should be mentioned here, and some quantitative estimate given of the timespan necessary for soil reformation.

The loss of existing vegetative communities and their replacement by a grass-32 land monotype should be emphasized here. This less diverse flora will result in degradation of habitat for all indigenous fauna, and will not support wildlife.

23 No nests of endangered species of raptors were found during environmental surveys. Text has been changed.

24 In January 1979 during severe winter weather, the local mule deer were sighted adjacent to the mining activities, contentedly munching hay from bales that had been furnished them by the applicant (oral communication, 1979, E. G. A. Weed, Geologist, U.S. Geological Survey).

25 As stated in the Summary (p. iii) only 500 to 2,200 acres will be impacted at any one time.

26 Revegetation for wildlife is expected to be successful.

27 Mining activity will reduce available habitat during the life of the mine and it is possible that additional damage claims may be received by the Wyoming Game and Fish Department.

28 Wyoming "rare" species are included in the populations discussed in section G, chapter III. Text has been changed.

29 Impacts of the railroad spur and powerline are discussed on pages III-13 and III-14.

30 See previous responses on reclamation plans for wildlife support.

31 Discussion of soils in text has been revised.

32 See previous responses on reclamation plans for wildlife support.

Again, 40 years is not an acceptable period of time for the re-establishment of wildlife habitat. Impacts on mule deer and antelope have been seriously underestimated. Similarly, we do not agree that "most (species of wildlife) are expected to reinhabit reclaimed areas at about present levels within a few years," as the
32 reclamation plan will not replace existing wildlife habitat. We believe that impacts to small mammals, songbirds, raptors, and mammalian predators will be significant, again because reclamation is directed toward establishing a livestock grazing land use and fails to address wildlife habitat needs.

33 The lowered aquifer with respect to future water supplies is addressed, but the DES fails to mention effects on streams.

CHAPTER VI - The Relations Between Local Short-Term...(page VI-1)

This section underestimates the long-term significance of the loss of floral and faunal diversity on the site. Habitat for all species which depend on sagebrush (antelope, mule deer, sage grouse, and numerous species of non-game mammals and birds) will be seriously degraded. This will endure until the shrub portion of the existing vegetation is re-established. We do not believe that many species will reinhabit the area at "nearly their present levels" until pre-mining vegetative composition is re-established. The cumulative effects on relationships of ground and surface waters should be addressed.

34

CHAPTER VII - Irreversible and Irretrievable Commitment...(page VII-1)

This section glosses over the irreversible long-term losses in vegetative diversity and concomitant impacts on the wildlife resource. We believe significantly more than 100 antelope will be affected. We do not believe that populations of small mammals, birds, reptiles, and amphibians will "reattain nearly pre-mining levels within a decade after reclamation." These populations will remain depleted until their habitat is re-established in quality and quantity comparable to the pre-mining environment.

CHAPTER VIII - Alternatives to the Proposal

Selection of Alternatives E or F would be in the best interest of wildlife.

E. Approve the Proposed Mine Plan...(page VIII-2)

To approve the proposed mine plan contingent upon modification to comply with existing laws and standards would provide the opportunity for additional fisheries
35 considerations. Mining should not be allowed until it is demonstrated that mining 1) can be done without cumulatively or individually jeopardizing flows in the Belle Fourche River and water levels of Keyhole Reservoir or 2) will incorporate adequate aquifer reclamation measures to correct any short-term disturbances. As far as we know, adequate aquifer reclamation measures do not exist. Our concerns for the effects of aquifer disturbance are supported by information presented in reports by

33 The text has been revised. See also response 18 above.

34 See previous responses on reclamation plans for wildlife support.

35 Your position on this matter is noted.

Wayne A. Van Voast and Robert B. Hedges for the State of Montana Bureau of Mines and Geology (see attachments).

F. Approve the Proposed Mine Plan...(pages VIII-3 thru VIII-6)

2. Modification of Proposed Soil-Reclamation Procedures (pages VIII-3 thru VIII-5)

We recommend that all three procedures—snow fencing, soil surface tillage, and mulching be added to the reclamation plan. We also recommend that a significant percent of the reclaimed total vegetative cover be devoted to native shrub species which are preferred species for wildlife.

We support the use of topsoil or vegetation patches as methods of re-establishing native vegetation on the reclaimed site. However, the possibility of using commercially available seedlings to re-establish shrub species has not been presented.

36 3. Modification of Proposed Wildlife-Management Practices (pages VIII-5, VIII-6)

We support all proposed modifications. Rockpiles will not replace existing outcrops, but they will provide some valuable cover and habitat diversity. We do not believe that federal law will permit construction of powerlines that are not raptor-proof, so this measure should be included in the mining plan. All fence specifications should conform to Wyoming Game and Fish Department guidelines for fencing deer and antelope range.

4. Utilization of Buses to Transport Employees To and From Work (page VIII-6)

We support the use of buses to transport employees to and from the mine. This should reduce illegal kills and wildlife-automobile accidents.

This DES fails to present an adequate description of the existing environment. It does not recognize wildlife habitat as a legitimate land use. It suffers seriously from a lack of data and makes many statements without benefit of supportive
37 facts or references. It proposes reclamation practices which are unclear and of uncertain benefit to wildlife. It fails to recognize or glosses over serious impacts of the proposed action. We have noticed a tendency in recent impact statements toward approving an action just because an EIS has been written, regardless of the quality of the document. The National Environmental Policy Act requires an adequate assessment of environmental impacts. This EIS does not do that.

If we can be of further assistance on this project, please do not hesitate to contact us.

Sincerely,

W. Donald Dexter

W. DONALD DEXTER
ASSISTANT DIRECTOR, OPERATIONS
WYOMING GAME AND FISH DEPARTMENT

WDD/HBM/mlr
encl (2)
cc: Wyoming State Planning Coordinator

36 Your position on this matter is noted.

37 Your position on this matter is noted.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming Recreation Commission

604 EAST 25TH STREET CHEYENNE, WYOMING 82002

JAN L. WILSON
Director
777-7695

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November 2, 1978

Mr. H. William Menard
Director, U.S. Geological Survey
National Center - Mail Stop 108
Reston, Virginia 22092

Dear Mr. Menard:

1 The Wyoming Recreation Commission would like to see Caballo Mine and Reclamation Plan address the impacts on recreational facilities in the Campbell County area as well as the lands under consideration for mining. Recognizing local concern for the scenic, historic, and recreational lands and facilities in the State and realizing the responsibility of this generation to protect Wyoming's
2 quality of life, we feel provision should be made for meeting recreational needs in newly formed high density population centers where present facilities often prove inadequate.

Sincerely,

for Jan L. Wilson
Director

Robert Stevenson

by Robert B. Stevenson
Recreation Specialist

JLW:RBS:lcl

Responding to: Robert B. Stevenson
Recreation Specialist
Wyoming Recreation Commission
604 East 25th Street
Cheyenne, Wyoming 82002

1 The rapid population growth resulting not only from the Caballo mine but from the other energy development in the area will strain existing recreation facilities, particularly since so little public land is available. "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979) discusses these impacts in some detail.

2 The Bureau of Land Management has proposed (43 Federal Register 49016-17, October 20, 1978) that loans be made available "to relieve social or economic impacts." The money could be used for planning, construction, and maintenance of public facilities. These funds could be used to help alleviate the impacts on recreational facilities.

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

State Conservation Commission

2219 CAREY AVENUE PHONE (307) 777-7321 CHEYENNE, WYOMING 82002

WAYNE A. EDGERTON
CONSERVATION COMMISSION STATE EXECUTIVE

TIMOTHY J. KAUTZA
DISTRICT PROGRAM CONSULTANT

DWIGHT KIMSEY
208 WATER QUALITY COORDINATOR

COMMISSION MEMBERS:

LARRY BOURRET, CHAIRMAN (STATE AG. DEPT.)
CHARLES JAMIESON, VICE-CHAIRMAN (AREA V DIRECTOR)
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GEORGE CHRISTOPULOS (STATE ENGINEER'S OFFICE)
EUGENE HARDY (LIVESTOCK BOARD)
JOHN NILAND (D.E.P.A.D.)

October 25, 1978

M E M O R A N D U M

TO: Don Daiss, Assistant Commissioner of Agriculture

FROM: Timothy J. Kautza, District Program Consultant *Tim*

SUBJECT: DRAFT ENVIRONMENTAL STATEMENT PROPOSED MINING AND RECLAMATION PLAN -- CABALLO MINE

I have reviewed the above named subject and offer the following comments for your consideration.

Surface water drainage plans and sediment control measures to be utilized during mining appear adequate. Post mining reclamation plans for surface drainage and erosion control are not. I realize that exact surface drainage and erosion control measures design is not possible at this stage, but I believe that anticipated needs can be predicted. Methods of applying erosion control measures and surface drainage systems should be included as part of the reclamation plan.

1 Erosion prevention procedures concerning soil stockpiles is also inadequate. The Mine Plan states that, "Topsoil that has to be stockpiled for more than a few months will be mulched or seeded with quick growing cover species to prevent erosion." The stabilization of topsoil stockpile is inherent to adequate revegetation following mining. More detailed specifications should be included.

2 Revegetation seeding rates, seedbed preparation and erosion control measures should also be covered in more detail.

I recommend that the Carter Mining Company contact and cooperate with the Intermountain Conservation District, 4th & Miller, Gillette, 82716 (682-8841) and the High Plains Grasslands Research Station, Route 1, Box 698, Cheyenne, 82001. Both agencies can provide information concerning my comments made in this memorandum.

3 A copy of Standards and Specifications for Mine Reclamation might also be helpful and is available free of charge from the State Conservation Commission.

PROTECT OUR HERITAGE
through the
Conservation of Wyoming's Natural Resources

Responding to: Timothy J. Kautza
District Program Consultant
Wyoming State Conservation Commission
2219 Carey Avenue
Cheyenne, Wyoming 82002

1 Several sections of part 715 of 30 CFR 700 (SMCRA) specify the controls that must be used to stablize topsoil storage and surface drainage systems and reduce or prevent erosion. As stated on page I-1, the mining and reclamation plan discussed in this DES was submitted for review prior to promulgation of 30 CFR 700 and organization of the Office of Surface Mining. Before mining can proceed on the Federal leases, OSM must be satisfied that the mining and reclamation plan meets these provisions.

2 On slopes less than 3:1, the replaced topsoil will be worked with a disc or similar farm implement until the soil is of optimum texture to encourage seed germination. On slopes greater than 3:1, dozers will push the topsoil up the slopes until it is evenly distributed. The action of the dozer tracks will serve to break large topsoil clods down to the soil texture needed to support revegetation. The dozer tracks will also create pits along the entire slope which trap moisture and encourage seed germination.

Prior to reseeding an area, chemical analyses will be performed on the recently replaced topsoil to determine fertilizer needs (if any). Annual weeds will be controlled primarily by mechanical methods. If large amounts of annual weeds are present on the replaced topsoil prior to reseeding, they will be fallowed. A wood fiber mulch will be applied with the seed mixture and fertilizer per acre of reseeded land. The wood fiber mulch adheres naturally to the surface of the replaced topsoil as it dries. A straw mulch will be applied with a straw blower machine on slopes of less than 3:1. Two tons of the straw mulch will be applied separately after the seed and fertilizer, which are applied with a drill seeder. Straw mulch will be crimped into the ground by a straw crimper pulled behind a tractor.

Newly seeded areas will be protected from livestock and antelope grazing by constructing woven and/or barbed-wire fences where needed. DEQ and BLM fence guidelines existing at the time a fence is to be constructed will determine the type erected.

Erosion of replaced topsoil will be controlled by (1) minimizing the slope steepness of recontoured and retopsoiled slopes, (2) reestablishing a vegetation cover on replaced topsoil as quickly as possible, (3) positioning wind rows horizontally across the slope rather than vertically, (4) recognizing soils with high erosion potential during topsoil recovery and insuring that they are mixed with less erosive topsoil material during stockpiling, and (5) stabilizing those drainage channels having a high erosion potential with erosion preventative structures (gabion baskets, collection berms, drop culvert pipes, etc.).

3 The applicant will be informed of your suggestions.

THE STATE OF WYOMING

Ed Herschler, *Governor*

Leno Menghini, *Superintendent and Chief Engineer*

Wyoming State Highway Department

P. O. BOX 1708 CHEYENNE, WYOMING 82001

M E M O R A N D U M October 26, 1978

TO: State Planning Coordinator
Wyoming State Clearinghouse
2320 Capitol Avenue
Cheyenne, Wyoming 82002

FROM: William P. King, P.E., Environmental Services Engineer WPK

SUBJECT: Comments on Draft E.I.S. for Proposed Mining and Reclamation Plan for Caballo Mine, Campbell County
State Identifier Number 78-124 D

1 We see little impact on the State Highway System from this mine alone. However, we are concerned about the cumulative impact of this and other mines in the Powder River Basin, particularly on railroad/highway crossings on all public roads and streets.

As more mines are put into production, or production increased, there is a corresponding increase in both train and automobile traffic. This not only intensifies hazards inherent with at-grade crossings, but also causes delays, crossing blockage, noise, and other frustrations on a cumulative basis to approach intolerable levels.

As train and auto traffic increase the need for separated crossing becomes more urgent on all public roads, regardless of their jurisdiction. And the public agencies simply do not have the funds to respond to these urgent needs.

The greatest impact perhaps is on the communities along railroads outside the immediate Powder River Basin. Severe impacts to intercommunity travel can be anticipated in Newcastle, Lusk, and Torrington as well as smaller communities that do not have any separated railroad crossings.

Since the Caballo Mine is already in operation and permitted for an annual production of up to 8 million tons (see attached newspaper article) we see little to be gained by denying the Federal lease or imposing any additional conditions. The impacts are going to be experienced with or without the Federal lease.

Responding to: William P. King, P.E.
Environmental Services Engineer
Wyoming State Highway Department
P.O. Box 1708
Cheyenne, Wyoming 82001

1 These cumulative impacts on highways, railroads, and communities from all the energy development in the Eastern Powder River Basin are discussed in some detail in "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979).

THE CARTER MINING COMPANY
GILLETTE, WYOMING 82716

DARRELL G. WARNER
Vice President

Post Office Box 209

December 1, 1978

Mr. H. William Menard
Director, U. S. Geological Survey
National Center, Mail Stop 108
Reston, VA 22092

Dear Mr. Menard:

Draft Environmental Statement 78-43, Caballo Mine
Campbell County, Wyoming

Enclosed for your review are the comments prepared by The Carter Oil Company and The Carter Mining Company regarding DES 78-43 for surface mining of coal at the Caballo Mine, Campbell County, Wyoming (Federal Coal Leases W-3397 and W-49644).

Our comments are presented in two parts. The first part contains editorial comments and minor clarifications; the second part contains matters which we feel require more extensive discussion. These matters include:

1. Clarification of the assumption that soil productivity potential will be reduced on about 6,700 acres.

2. Concern over vegetative diversity.

3. Socioeconomic conditions.

4. Certain alternatives listed in Chapter VIII of the DES.

Thank you for your consideration of the enclosed comments.

Yours truly,

D. G. Warner

DGW/cg
cc: E. G. A. Weed
USGS Task Force Leader

EDITORIAL COMMENTS AND MINOR CORRECTIONS

PART I

The following comments are referenced to the Caballo DES by chapter (Roman numeral), page within the specified chapter, and paragraph and sentence to which the comment applies. The suggested change is underlined where applicable.

1 Page I-2, paragraph 3, first sentence

Comment: Editorial changes.

Suggested change: The land proposed for mining (minesite) also includes 320 acres under preference right lease application (PRLA) W-32063 held by Peabody Coal Company.

2 Page I-3, paragraph 3, first sentence

Comment: Editorial change.

Suggested change: The Carter Oil Company made an easement, encroachment, and sublease agreement with Meadowlark Farms . . . on September 21, 1976 . . .

3 Page I-3, paragraph 2

Comment: The USGS should refer to each specific map figure on Map 1 for clarity.

Suggested change: "The state has approved a permit (Map 1, Figure A; . . ."

4 Page I-5, paragraph 1, last sentence

Comment: Editorial update.

Suggested change: The company is committed to supply approximately 22 percent of the Caballo reserves to the Omaha Public Power District and Western Fuels Association, Inc. a cooperative buying agency for the

Responding to: Darrell G. Warner
Vice President
The Carter Mining Company
Gillette, Wyoming 82716

1 The text has been changed.

2 Clarification from the applicant has determined that the correct date is December 14, 1976. In addition, the agreement with Amax was reconfirmed by letter on November 2, 1978. The text has been changed.

3 The individual figures on map 1 present an analysis of information about the Caballo leasehold and should be compared with each other to clarify relationships of the various types of juridictions.

4 The text has been revised to incorporate information from the applicant.

Kansas City Board of Public Utilities, the Basin Electric Power Cooperative, and other coal consumers.

5 Page I-5, paragraph 2, second and fourth sentences

Comment: Editorial change.

Suggested change: All but approximately 10 million tons of this permitted capacity has been committed to electric utilities under existing long-term agreements. This remaining 10 million tons has been offered for shipment to fulfill early requirements of further proposed long-term sales agreements. The Carter Oil Company is discussing several possible sales agreements ~~with shipments beginning in 1979,~~ but has encountered difficulty in completing several such additional coal sales due to a lack of sufficient permitted reserves and mining capacity to support the additional long-term sales.

5 The text has been revised to incorporate information from the applicant.

6 Page I-5, paragraph 5, first sentence

Comment: Add "haul" roads for completeness and clarity.

Suggested change: "Access and haul roads will be built of compacted overburden surfaced with crushed clinker. The haul roads will be approximately 80 feet wide and elevated from 1 to 3 feet above ground level."

6 The text has been revised to incorporate information from the applicant.

7 Page I-6, paragraph 4, first and second sentences

Comment: Replace "Wasatch" with Fort Union and northwest with west.

Suggested change: "Potable water will be supplied by a well drilled into the Fort Union aquifer at the mine plant site. Industrial water, which will be used mainly for dust suppression on active haul roads, will come mainly from mine drainage collected in a settling pond and from a mine dewatering well west of the boxcut.

7 The text has been revised to incorporate information from the applicant.

8 Page I-7, paragraph 3

Comment: Indicate the existence of berms by adding the following sentence:

Suggested change: Diesel fuel and gasoline will be stored in aboveground tanks. Berms will be constructed to contain any spills that might occur.

8 The text has been revised to incorporate information from the applicant.

9 Page I-7, paragraph 4, first sentence

Comment: North Tisdale Creek will be diverted by the initial drainage plan.

Suggested change: The initially proposed drainage plan (Figure I-2) will divert Tisdale Creek and North Tisdale Creek, two of the three major drainages in the mine, around the plant site.

9 The text has been revised to incorporate information from the applicant.

10 Page I-11, Figure I-3

Comment: Editorial change.

Suggested change: The pit width should read "Up to 7,000 feet" rather than "Up to 2,500 feet."

10 The text has been changed.

11 Page I-14, paragraph 2, first and second sentences

Comment: The Carter Mining Company has agreed with the Wyoming DEQ to spread a minimum of 12 inches of topsoil over reclaimed areas and scarify the soil via bulldozer tread tracks. This scarification procedure is incident to topsoil spreading and should not be referred to as a "range·pitter or similar machine."

Suggested change: After the spoil is shaped, a minimum of 12 inches of topsoil will be spread.

11 The text has been changed.

12 Page I-15, paragraph 5, second sentence

Comment: Editorial clarification is necessary to describe the boundary markers.

Suggested change: All ~~boundary-fences-and~~ entrances to the plantsite and minesite will be marked by clearly legible signs displaying mine-property warnings. The permit area is delineated by painted steel boundary markers.

12 The text has been revised to incorporate information from the applicant.

13 Page I-16, paragraph 7, first and second sentences

Comment: Five stream gaging sites are being monitored at Caballo. These include: Tisdale Creek (upstream and downstream), Gold Mine Draw (upstream and downstream), and North Tisdale (upstream). In addition, downstream flows at North Tisdale Creek are monitored by performing slope-area calculations for high water flows through the North Tisdale rechannel. All sites will probably have measurable flow only once or twice a year.

Suggested change: Streamflow will be recorded at five sites: on Gold Mine Draw and on Tisdale Creek both above and below the mine, ~~and-on-upper-Gold-Mine-Draw~~, and on upper North Tisdale Creek. All sites will probably have measurable flow only once or twice a year.

13 The text has been revised to incorporate information from the applicant.

14 Page I-17, paragraph 5, second sentence

Comment: Roads and ditches will be designed so as to cross streams at right angles in most instances in order to minimize surface structure impediments to the stream. This will be done in accordance with our understanding of 30 CFR 211.40(a)(16), USGS coal mining operating regulations and 30 CFR 717(J)(1)(ii), OSM regulations.

14 The text has been revised.

15 Page II-1, paragraph 3, first sentence

Comment: The terminology used in reference to "playas" requires clarification. By definition, playas are slight depressions on a desert plain which may be the sites of intermittent evaporative sediment accumulation (see page 548, Glossary of Geology). Either the terms salt pan (page 626, Glossary of Geology) or deflation basin-blowout (page 81, Glossary of Geology) may be more descriptive for the land forms described in this paragraph.

16 Page II-1, paragraph 5, second sentence

Comment: We have observed no "conglomeratic" sandstones in our Wasatch overburden.

Suggested change: The Wasatch formation on the Caballo site is comprised of fine-grained to medium-grained sandstones . . . .

17 Page II-5, paragraph 2, second sentence

Comment: The term "colluvium" is usually used to describe unconsolidated sediment which accumulates primarily as a result of mass movement such as talus deposits. In order for colluvium to be significant in this area the material accumulating would necessarily have to be from units above the Wasatch formation since it is composed of fluvial, paludal, and lacrestrine sediment and is considered to be the overburden unit.

18 Page II-5, paragraph 4, third sentence

Comment: "no chemical elements are present in amounts deserving special attention" requires qualification: i.e., "no toxic chemical elements". . . .

15 The definition for playa (Glossary of Geology, p. 548), describes a "dried-up, vegetation-free, flat-floored area." Several processes appear to be operating to produce these areas, including evaporation and wind erosion, which produce salt pans and deflation basins respectively. The text has been changed.

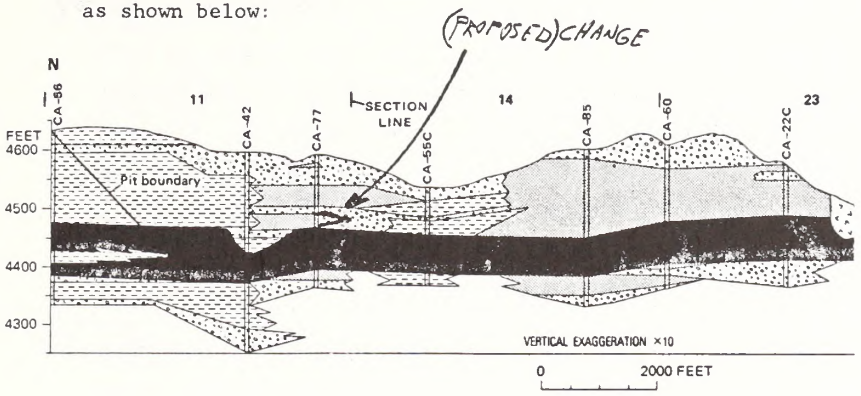
16 The text has been revised.

17 The unconsolidated material referred to may have been deposited by one or more of several different processes including sheet erosion, wind erosion, stream erosion, and mass wasting (gravitational deposition), producing sheet wash, eluvium, alluvium, and colluvium respectively. The text has been changed.

18 The text has been changed.

19 Page II-8, Figure II-5

Comment: On the N-S cross section, the southern termination of one "clay" unit between drill holes CA-77 and CA-55C seems unlikely and it is suggested that it be modified as shown below:



20 Page II-11, paragraph 2, first sentence

Comment: The suggestion that stream-channel sands along the three drainages on the minesite may intermittently transfer a considerable amount of water should be omitted. The predominant alluvial lithologies along Tisdale and North Tisdale Creeks are sandy clays, and clayey sands, with low permeabilities which probably don't transmit a considerable amount of ground water. The thickness of the sediments seldom exceeds 12 feet and the lower 1/3 to 1/2 of these sediments are probably perennially saturated along Tisdale Creek. The existence of a continuous perennial water table along North Tisdale alluvium has not been observed.

19 Figure II-5 has been revised.

20 The text has been revised.

21 Page II-11, paragraph 2, fourth sentence

Comment: Technical clarification is required for the lack of interconnection between clinker deposits in Sections 23 and 26.

Suggested change: These two clinker deposits are probably not hydraulically connected.

21 The text has been revised.

22 Page II-11, paragraph 3, first sentence

Comment: Reference to the sandstone aquifer in the overburden is in error. Reference to the geologic cross-sections (p. II-8) infers that there is no continuous sandstone unit which could be called a "sandstone aquifer." Rather there are several discontinuous sandstone lenses that comprise a low permeability overburden system. The discontinuous nature of the overburden sandstones minimizes off-site impacts.

Suggested change: Replace the first sentence of the third paragraph with the following: "Discontinuous sandstone lenses in the Wasatch Formation overburden form a limited aquifer system.

22 The text has been revised.

23 Page II-12, Figure II-6

Comment: The potentiometric map of the overburden has been updated and is attached hereto as a recommended replacement for Figure II-6.

23 The revised figure II-6 furnished by the applicant has been incorporated into the FES.

24 Page II-14, paragraph 1, first sentence

Comment: We have observed that water quality seldom varies to a significant extent with time. Enclosed please find Table D-6-2 which will supplement the initially submitted water quality baseline data.

24 The applicant's table (D-6-2) showing chemical analyses of water from observation wells and pumping test wells is on file with the regulatory authorities.

25 Page II-14, paragraph 3, first sentence

Comment: Editorial correction.

Suggested change: Chemical analysis of water from Wells CA-306 and PT-Q-6. . .

25 The text has been changed.

26 Page II-14, paragraph 4, first sentence

Comment: Tisdale and North Tisdale are ephemeral streams. Gold Mine Draw is ephemeral in its upper reaches. Lower Gold Mine Draw does have a small spring that creates a boggy area. Leakage from a stock dam also supplies minimal amounts of streamflow in this area.

Suggested change: "The Caballo Mine is drained by ~~intermittent and~~ ephemeral streams . . . .

26 The text has been revised to incorporate information from the applicant.

27 Page II-19, Figure II-7

Comment: Please indicate the source and criteria used to determine sediment values displayed in Figure II-7.

27 This map is based on sediment surveys of small reservoirs and on mapping of landforms (unpublished data, 1978, Lynn M. Shown, U.S. Geological Survey).

28 Page II-23, paragraph 5, first sentence

Comment: Technical clarification would require that the prairie falcon be classified as a rare, not endangered species in the state of Wyoming. The prairie falcon does not appear on the Federal list of endangered or threatened species.

Suggested change: The prairie falcon, a rare species in Wyoming has been observed on the Caballo leasehold. Periodic unconfirmed sightings of eagles have been reported in the area.

28 The text has been revised.

29 Page II-26, paragraph 2

Comment: Please make clear whether the number of trains per diem includes both loaded and unloaded trains.

29 This information is discussed in "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979,, p. R2-90 to R2-96 and p. R4-46 to R4-50); trains per day include both loaded and unloaded trains.

30 Page II-26, paragraph 3

Comment: We would recommend that a sentence be added to make clear the point that the new branch line between Gillette and Douglas will increase the Burlington Northern's total system capacity to transport coal from the Powder River Basin.

30 The text has been changed.

31 Page III-6, Table III-1

Comment: Editorial correction.

Suggested change: Total combined emissions (estimated for 1990) for particulates should be 24,344 tons per year.

31 The text has been changed.

32 Page III-8, paragraph 2

Comment: We cannot determine how $34,500 of gross income will be lost from vegetative production. Feed grains as computed from Campbell County production averages and current market rates are:

Oats	Barley	Wheat
$\frac{\$34,500}{\$30/Ac}$ = 1150 Ac	$\frac{\$34,500}{\$61/Ac}$ = 565 Ac	$\frac{\$34,500}{\$56/Ac}$ = 616 Ac

As there are less than 200 acres of land being farmed within the entire 10,040-acre permit area, considerably less than the calculations above would imply, a gross loss of $34,500 is difficult to understand. Similarly, the loss of grazing land at $3/ac would be more than the entire permit area: $\frac{\$34,500}{\$3}$ = 11,500 acres

32 The text has been changed.

33 Page III-10, Table III-2

Comment: Table III-2 indicates the 1985 mine-related population increase to be approximately 1500. However, the summary conclusions on page iii indicate a 1985

33 The date in the Summary has been changed.

Caballo related population increase of about 2,650 people, a value which would not be reached until the 1988 to 2018 time period according to Table III.

34 Page III-10, paragraph 1

Comment: This paragraph states, in summary, that mine-related growth will lower the overall quality of life in Gillette and Campbell County. While this may be a possibility, there is no evidence to support this unconditional statement. On the contrary, there are many factors to suggest that mine-related growth can be accommodated within development plans of the city and county and in some case will lend financial support to such programs as full utilization of the new hospital and repayment of revenues required to finance Gillette's planned water system expansion.

The social conditions referenced by FES 74-55, a document prepared in 1974 when "boomtown" conditions were handled differently, tends to produce erroneous impressions. The discussion seems to ignore positive attitudes and accomplishments of the governmental and business leaders in Campbell County over the last 4 years. Following are several examples of public services that indicate the area's progress in managing its growth problems.

MEDICAL SERVICES

Currently Campbell County is constructing a new hospital in Gillette at a cost of $8.5 M. The hospital has a license capacity of 59 beds with room for expansion to 100 beds on the third floor, which is not being finished at this time. It should open in late 1979 or early 1980. Currently the existing

34 Your comment is noted. Indications are that the city of Gillette and Campbell County are making progress in alleviating problems associated with their rapid growth. Additional discussion of socioeconomic factors in the area is given in "Proposed Development of Coal Resources in Eastern Powder River [Basin,] Wyoming" (FES 79-17, April 1979).

hospital has 31 beds.

In 1978 there were 1.24 hospital beds per 1000 population in the county. With opening of the new hospital in 1979-80, the number of beds will increase to 1.85 per 1000, assuming the population increases to 32,000 as predicted. If the additional 41 beds on the third floor were to be finished by 1980, the bed/population ratio would increase to 3.2 beds per 1000. The complete 100-bed facility has the capability of adequately serving a population of 64,000 or the total projected for 1990 in several reports.

The new hospital will ultimately provide greatly improved medical services to northeastern Wyoming, if sufficient growth allows for financial support and expansion. Such growth will be required to effectively utilize the facility and repay the construction loan and cover operating costs.

In July 1975 there were eight doctors in the county and the doctor to population ratio was 1:1636. According to the Socioeconomic Monitoring Report for Black Thunder Coal Mine dated July 1978, the number of physicians in the county has increased to 14 and the doctor to population ratio stands at 1:1600 in spite of an overall increase in population in the 1975-78 period. The Pronghorn Mine EIS showed the doctor to population ratio was more favorable in August '77 (1:1700) than existed in August '72 (1:1851). Since August '77 the ratio has improved even more.

Based on the foregoing, it appears that medical services are being planned and provided to the county's growing population and there is provision for expansion to accommodate future growth.

SCHOOLS

The School District has demonstrated the ability and willingness to meet educational requirements of a growing population. Data contained in the Monitoring Report for ARCO's Black Thunder Mine (1978) indicates favorable educational operating ratios for the District. The District has a very favorable financial condition based upon their low percentage of obligated bonding capacity. There is no reason to believe the schools will not continue to meet their obligations in the future. Historically, they have aggressively addressed the problem of rapid growth.

POLICE

Campbell County has a total of 41 law enforcement officials or 1.8 per 1000 residents. This compares favorably with the national average of 1.9 per 1000. City and county officials have recognized and responded to the need for increasing the number of law enforcement officers in active service. In December of 1975 there were 30 officers and during 1977 the number averaged 41 for the year. There is no reason to believe elected city and county officials will not work toward providing adequate police protection in the future.

WATER SYSTEM

Both water availability and quality in northeastern Wyoming has historically been poor to marginal. Recently Gillette voters approved a proposition to improve and expand the city's water supply system. The plan will involve the expenditure of $22-23$\bar{M}$ to bring water into the city via a 41-mile aqueduct system connected to a well field producing from the Madison formation. The system is designed to support a population of 35,000 people within the city limits

of Gillette. The cost of the system will be paid at least in part by user fees paid by city residents. Currently, the Gillette population is approximately 14,000; thus the proposed water can accommodate additional city residents. In fact, population growth in the city will be required if water user rates are to be maintained at a reasonable level.

35 Page III-8, paragraph 5, first sentence

Comment: The suggestion that 100 antelope would be progressively displaced during mining may lead to a misunderstanding as to what is actually occurring. Given an average density of 10 antelope/mile^2 (University of Wyoming studies) and a maximum disturbed acreage value of 1,278 acres (year 2010), this results in a maximum of 20 antelope which would be displaced at any time. Only by assuming that the entire 6,700-acre area would preempt antelope usage can a value of 100 antelope be obtained. But as pointed out, over 90% of the minesite is available for antelope usage at any time during the life of the mine, and by observation there is no reason to believe that they do not utilize this area in their normal population densities.

Suggested change: ". . . although approximately 100 antelope and 10 sage grouse will probably be progressively displaced during mining, approximately 20 antelope and 1 sage grouse could probably be displaced at any one time and even these would migrate to other portions of the minesite and reinhabit the reclaimed areas as mining activity moves progressively across the permit area."

36 Page III-8, paragraph 5, third sentence

Comment: The suggestion that 20 pairs of waterfowl will

35 The figures given for animal displacement are cumulative and may be low. The density of species is known to vary seasonally; see comments by EPA, FWS, and Wyoming Game and Fish Department. The total acreage being used including the minestie, layback, plantsite, roads, railroad, etc., will range from about 500 to 2,200 acres in any one year. The maximum acreage to be newly disturbed during any one year will be 1,278 acres; this is expected to occur in the year 2010.

36 See response 35 above.

be displaced because of temporary loss of stock ponds again seems overstated. University of Wyoming studies indicate one pair of waterfowl per stock pond. As there are 50 stock ponds on the 10,040-acre leasehold with probably no more than five or six stock ponds being disturbed at any one time, the number of waterfowl displaced to a neighboring stock pond would be much less than 20 pair.

37 Page III-13, paragraph 4, second sentence

Comment: "Wear on track and equipment" is noted ostensibly as a form of adverse impact. It does not appear that wear on railroads is an impact of an adverse nature. Many railroads would welcome the opportunity to have sufficient traffic to generate wear and tear on their facilities. If the impact of transportation is to be fully assessed, additional desirable impacts such as economic and employment benefits resulting from growth of the transportation industry should be noted separately and not commingled with adverse impacts such as increased air pollution.

38 Page V-2, paragraph 2, first sentence

Comment: See comment No. 35 regarding antelope displacement.

39 MAP COMMENTS (Maps located in pocket part)

Map 1A: The note describing the eastern portion of Federal Lease W-3397 as "mining not proposed" may imply that no mining is intended here. This is not the case and such description should be qualified with the phrase "mining not proposed at this time."

37 Your comment is noted.

38 See response 35 above.

39 Maps 1-3 have been updated, and, with new map 4, are in the pocket affixed to the inside back cover of this FES.

Map 1E: Please remove from Map 1E the temporary topsoil storage and the warehouse; both are presently located within the railroad loop. This correction will make Map 1E agree with Map 2.

Map 3: The 3 SD unit shown in the extreme northeast corner of Section 16, T48N, R71W, is an unsuitable topsoil and should be so designated with a "U." Also, the asterisk should reflect DEQ Guideline 2, not DEQ Guideline 3.

Map 4: Please provide a key identifying the areas delineated on the surface of the map.

40 Page iii (paragraph 2), page II-5 (paragraph 4), page VI-1 (paragraph 1)

Comment: An editorial correction is necessary to replace the 500 million tons projected recovery with 463 million tons of coal. The 500 million ton number reflects recovery from the 10,040 acre minesite. The 463 million ton recovery reflects mining on the 6,700 acres covered by this Draft Environmental Statement.

PART II

TOPICS REQUIRING MORE EXTENSIVE CONSIDERATION

1. Long-Term Productivity

Statements made on pp. III-3, V-1, VI-1, and VII-1 regarding loss of long-term productivity on reclaimed lands require further clarification. Since there does not appear to be any documented example in the Powder River Basin where long-term productivity in properly reclaimed soil (using procedures comparable to those being employed at the Caballo Mine) resulted, or is projected to result

40 The text has been changed to incorporate information from the applicant.

in a decrease in productivity, it is presumed that statements suggesting that productivity will be lower after mining than before mining relate to the actual production of native plant species after mining. An improved seed mixture which was selected and approved by The Carter Mining Company and the Wyoming Department of Environmental Quality should result in an improved productivity for the post-mining intended land use, i.e., improved pasture for grazing of livestock. Field trials conducted on these introduced vegetative species have demonstrated that the introduced species are of equal or superior utility for the approved post-mining land use.

41 General recognition of enhanced post-mining productivity exists in the Draft Environmental Statement for the Coal Creek Mine, Campbell County, Wyoming, DES 78-35. On page iv of that USGS document it is stated, "With successful reclamation, the long-term agricultural productivity of the land should increase." Similarly the Bureau of Land Management, while indicating a possible reduction of soil and vegetative productivity after reclamation, states on page R6-1 of the Draft Environmental Statement, Eastern Powder River Coal Regional Analysis update for FES 74-55 that "soil productivity levels (on 50,603 acres, 1% of the Eastern Powder River Region) would be restored in the long run to varying degrees and in some cases could equal 100% of the premining levels with successful reclamation." Personal communications with Dr. Lee Painter, head of the University of Wyoming Plant Sciences Division indicates that long-term productivity levels on successfully reclaimed lands in this area should equal or exceed those forage productivity levels associated with premining conditions.

41 Your comments are noted. Long-term productivity has been analyzed to include wildlife use. Although prognosis is encouraging, there is at present no long-term data base on western coal strip-mined lands that can be relied on to predict restoration of long-term productivity. Short-term productivity for the DEQ approved postmining use may indeed be improved. On some lands productivity has been shown to increase for introduced species under proper management in early years, but productivity may drop with time and may fall below premining levels. The durability and reproducibility of some introduced species during a dry precipitation cycle has also not been tested for the western coal strip-mined lands.

While we can find no evidence to suggest decreases in productivity on successfully reclaimed land, there is evidence to suggest increases in productivity in reclaimed soil over that of premining conditions. There are examples in the region such as Peter Kiewit's Big Horn Coal Mine, where productivity six years after reclamation, has increased between 2½ to 3 times that of premining productivity. Also, average productivity for the permit area showed increases when comparing average reclaimed land to average native land productivity. These increases range from approximately 1.65 to 2.7 times the productivity on native soil.

It appears likely that any conclusion regarding a reduction in soil productivity was predicated on a postulated reduction in the post-mining production of native species. When considering the productivity of introduced species, the combined post-mining productivity should be equal or superior to that of native rangeland. This clarification is respectfully suggested to avoid misinterpretations regarding the improved post-mining land use for livestock grazing.

2. Vegetative Diversity

Statements made on pp. III-8, VI-1, and VII-1 regarding vegetative diversity and the destruction of specialized habitats deserves further qualification. As discussed above, the loss of vegetative
42 diversity is a natural consequence of the goal of achieving an improved pasture for the grazing of livestock and is implied in our DEQ approved list of introduced grass species. To be consistent with our approved post-mining land use, a decrease in vegetative diversity is not only a necessary result, but also advantageous

42 Proposed seed mixtures (DEQ approved) include 14 species for use in varying proportions on 8 different soil types.

in our effort to establish more productive grazing land. There are no specialized habitats unique to the Caballo site which would be destroyed. The winter grazing for antelope and deer that may be afforded by certain native vegetative species is not a significant adverse impact because: (1) in Campbell County alone there are over 3 million acres of native vegetation which can support such winter grazing by native animal species. The entire grazing range in the Powder River Basin available to antelope and deer and other animal species is in excess of 9 million acres as compared with the 6,700 acre minesite proposal of which a maximum of 1,278 acres would be disturbed at any one time (.04% of the 3 million acres in Campbell County), (2) native plant species have been observed for several decades to reclaim areas where they have been intentionally removed usually through attempts to improve pasture lands and road side vegetative cover. Most familiar to those knowledgeable with native range is sagebrush. Programs such as railing, plowing, cultivating, and reseeding with improved grass seed mixtures have been directed to eradicating sagebrush. The results have been limited due to the prolific nature of the native species and its inherent ability to reestablish itself in these improved grazing areas, (3) where introduced vegetative species are planted to upgrade overall vegetative productivity consistent with an approved post-mining land use, this in turn can improve soil surface stability by virtue of the projected increased plant density, and (4) by completely ignoring the benefits associated with the improved pasture, no measurable adverse effects associated with the lag time in reestablishing native plant species has been stated quantitatively or even qualitatively. Regardless of whether reestablishing native species takes 10 years or 40 years,

the impact of loss of the diversity would be negligible relative to available winter grazing in the basin. When there is no snow cover, the loss of diversity could be considered a benefit for native animal species who have by observation displayed a pronounced preference to graze on improved pasture and croplands.

3. Socioeconomics

Page III-11 presents some of the economic conditions associated with the operation of the Caballo Mine. Rather than comment directly on the assumptions and projections employed by the USGS in assessing the costs and benefits of the proposed mining operations,

43 we have chosen to present additional material which we feel will be beneficial in addressing more completely, the economic consequences associated with the Caballo Mine. This includes the benefits which extend to both state and federal authorities, and inure to the national economy as well.

A. Payments to Government Agencies

A variety of taxes and other payments will be collected by the appropriate governmental authorities. These include state sales taxes, property taxes, royalties, state severance taxes, and fees imposed by the Surface Mining and Reclamation Act of 1977. A list of the amounts of monies estimated to be paid by The Carter Mining Company when the mine's annual production reaches 12 million tons appears on Table I. These estimates are based on current taxing structures, projected coal sales, and an assumed average 1978 coal price exclusive of transportation cost:

43 Thank you for the additional information regarding the economic consequences associated with the Caballo mine.

Table I

Estimated Annual Payments Resulting From
The 12MM Ton Caballo Mine*

Payment	Benefiting Authority	Payment for 12MM Ton Annual Prod.
State & Local		
Ad Valorem (Real & Intangible Property)	Campbell County	217M
Sales	State of Wyoming	132M
	Campbell County	6M
Excise & Severance Taxes	State of Wyoming	4.3MM
Ad Valorem (Prod.)	Campbell County	1MM
Reclamation Fee	Dept. of Interior/ State of Wyoming/ Campbell County	2.4MM
State Lease Royalty	Wyoming	3.8MM
Campbell County Independent School District	Campbell County/Gillette	2.1MM
	Subtotal	14.055MM
Federal		
Federal Lease Royalty	USA	1.3MM
	TOTAL ANNUAL PAYMENTS	15.355MM

*All dollars appearing in this table and the remainder of this section are based on 1978 prices and tax rates.
(M = 000, MM = 000,000)

Payments (1978 dollars) in Table I are, of course, ultimately charged to the consumer of the coal and in turn to the consumer of electricity which is generated from the conversion process. However, they represent the transfer of money to the beneficiaries of the payments and are, therefore, classified as benefits to the society.

The estimated Caballo Mine will increase the assessed valuation of Campbell County by about $11 million to somewhat more than $506 million (1978 dollars), an increase of over three times the 1970 assessed valuation of about $125 million. This increase should eventually have a direct and significant impact on the local tax base and may ultimately lower county tax assessments to all county citizens.

As shown on Table I maximum property taxes (real, intangible, and production) resulting from the Caballo Mine are estimated to be $3.3 million per year. The major recipient will be the Campbell County Independent School District with $2.1 million per year or 64% of the total property taxes. Campbell County will receive about $1.2 million ad valorem tax income or some 36% of the Caballo property tax. The total present value of the lifetime benefit of taxes and royalties will be in excess of one billion dollars. The present value of the lifetime benefit to each of the benefiting authorities is shown on Table II.

Table II

Estimated Present Value of Lifetime Benefits
Paid by the Caballo Mine*

Payment	Benefiting Authority	Payment for 12MM Ton Annual Prod.
State & Local		
Ad Valorem (Real & Intangible Property)	Campbell County	5.8MM
Sales	State of Wyoming	7.2MM
	Campbell County	345M
Excise & Severance Tax	State of Wyoming	136MM
Ad Valorem (Prod.)	Campbell County	31.8MM
Reclamation Fee	Dept. of Interior/ State of Wyoming/ Campbell County	44.2MM
Campbell County Independent School District	Campbell County/Gillette	66.9MM
State Lease Royalty	Wyoming	24MM
	Subtotal	316.245MM
Federal		
Federal Lease Royalty	USA	145MM
TOTAL PRESENT VALUE OF LIFETIME BENEFITS		461.245MM

*1978 dollars based on 1978 prices and tax rates
(M = 000, MM = 000,000)

Part of the revenues from the coal sold from the Caballo Mine are subject to federal income tax, which estimates are not included in this analysis.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) imposes upon the Caballo Mine a reclamation fee of 35 cents per ton of coal produced by surface coal mining. Fifty per centum of the funds collected annually in Wyoming from the Caballo Mine must be allocated to Wyoming by the Secretary of Interior pursuant to any approved abandoned mine reclamation program which accomplishes the purposes of Title IV of the SMCRA. Where the Governor of Wyoming certifies that certain requirements regarding the purposes of Title IV have been achieved all or part of the 50 percent share of the reclamation fee that Wyoming could receive may be allocated for construction of specific public facilities in communities in Wyoming impacted by coal development. Thus all or part of the 50 percent share of the lifetime benefit of the reclamation fee or $22 million could be spent in Campbell County or other Wyoming counties for such construction activities as the protection, repair, replacement, construction or enhancement of public facilities such as utilities, roads, recreation, and conservation facilities The balance of the reclamation fee paid from coal mined at Caballo or $22 million per year may be expended in any state at the discretion of the Secretary of Interior.

An excise tax on extraction of coal from the Caballo Mine totaling 8½ percent and representing an annual payment of $3.5 million at 12MM tons yearly coal production is paid to the state of Wyoming for use within the state. Two and one half percent or $1.028 million yearly goes to the permanent Wyoming mineral trust fund. Two percent of the excise tax or $822 thousand yearly is

transferred to the state's general fund. One and one half percent of the excise tax or $616 thousand yearly is allocated to the Wyoming water development account until that fund reaches a balance of $100 million. After that balance is reached, the revenue collected is deposited into the state's general fund. One percent or $411 thousand of the excise tax is transferred to the highway fund. The remaining 1½% of the 8½% excise tax revenues or $616 thousand from Caballo gross production is earmarked for the capital facilities revenue account for the purpose of retirement of bonds issued for construction of the Hathaway Building and the planning, maintaining, operating, and financing of permanent capital facilities for Wyoming governmental operations including the University of Wyoming and the community colleges of the state. Fifteen percent of the 1½% of the capital facilities revenue from Caballo gross production or $8 thousand is transferred to a school district capital construction account with an additional 10 percent of 1½% or $5 thousand transferred to a community college construction account.

In addition to the excise tax, there is levied a severance tax in the amount of 2 percent beginning in calendar year 1978 and all subsequent years until its expiration on January 1 following the year in which cumulative taxes collected total $160 million. A black lung tax equaling 2 percent of the average sale price is paid to the federal government with the projected lifetime benefit equaling $26.8 million. Royalties on state coal produced are projected to afford a lifetime benefit of $24 million to Wyoming. 7.5% of the state coal leasing royalties are returned to affected municipalities or a lifetime total of $1.8 million. Similarly

the lifetime benefit of royalties paid to the federal government is projected to equal $145 million.

B. Payrolls and Employment

Expenditures for the construction and operation of the proposed facility represent an addition to the national as well as the regional income.

Construction has extended from December 1976 through the present with a total payroll outlay of $8.5 million in 1978 dollars. The mine will become fully operational about December 1, 1978, although some construction related activities will be ongoing and concurrent with mine operation. At 12MM tons production, the mine will employee about 305 permanent workers to operate and maintain the facility. These employees will earn an average salary of $23,500 in 1978 wage cost resulting in an annual payroll at full production of $7.4 million. Besides being an addition to the national income, these payroll outlays represent an addition to the income of the region. The lifetime payroll cost of operation discount at 7 percent is estimated at $232 million. A major portion of this payroll is expected to be spent in Campbell County.

The Caballo Mine will, of course, cause an increase in employment for the region over and above that of the project itself. Using a study entitled What New Jobs Mean to a Community published by the Chamber of Commerce of the United States, it is estimated that as many as 200 jobs will be created in the area because of the added 305 employees at the mine. These people will be needed to handle the additional services required by the new mine employees. The 200 jobs will amount to annual wages of $4.8

million. Discounted at 7 percent, the lifetime wages amount to $151 million from these service jobs. A second study prepared by the University of Denver Research Institute for the USGS estimates that about 2.2 new jobs for every permanent Caballo employee would be created in the area. This would result in over 730 jobs to handle the additional services required by new mine employees and would amount to annual wages of $16.3 million or $509 million lifetime wages discounted at 7 percent.

Materials and supplies purchased in the regional market are considered to be a benefit to the regional economy. It is estimated that $37.9 million has been spent regionally to construct the Caballo Mine and a projected lifetime expenditure for materials and supplies of $115 million will further add to the regional economy. Of this amount an estimated lifetime amount of $12 million will be spent within the county and $81 million within the state during mine operations.

C. Caballo Coal Benefits

The operation of the Caballo Mine will result in at least 463 million tons of coal produced over the mine life. Assuming an average heating value of about 8,100 BTU/lb. and an average delivered price of $16/ton, the energy price for the coal is about 98 cents/million BTU or equivalent to about $5.60/bbl crude oil or about $1/mcf gas cost. Since most gas and oil is sold at prices considerably higher than these costs, the less expensive fuel reflects cost savings to the electric utility customer.

The approximate 463 million tons of coal is roughly equivalent to 7.5×10^{15} BTU's or over 1 billion barrels of crude oil. With imported crude oil prices ranging from $14 to $15 per barrel, the

Caballo Mine will generate enough energy to equal over $15 billion that could otherwise be spent in purchasing foreign oil.

The power generated from the approximate 463 million tons of coal energy, using about 10,000 BTU/kwh generation efficiency, will yield about 750 billion kwh, enough electrical generation to serve an area of roughly 2.5 million people for 30 years. Several billion dollars of value added benefits will be made available annually by the power consumed by the industrial users of electricity generated from this fuel source.

In summary, the Caballo Mine will:

- Provide 463 million tons of coal.
- Will generate about $461.245 million in lifetime payments to benefiting authorities.
- Will create about 307 permanent jobs in Campbell County and between 200 and 730 indirect jobs from support services. The lifetime value for these jobs discounted at 7% ranges from $383 million to $741 million.
- Will result in the lifetime expenditure of $81 million within the state for materials and supplies and about 12 million with Campbell County.
- Will provide fuel for 750 billion kwh of electrical power.

- Will eliminate the need for over 1 billion barrels of imported oil equaling an export deficit of over 15 billion dollars.

4. Alternatives to the Proposal

44 Page VIII-3, Alternate F, "Approval of the proposed mine plan contingent upon additional mitigations," is perhaps premature considering the statement on page I-1 that "the mining and reclamation plan will be returned to the operator together with a request that it be revised in accordance with (OSM) regulations." Since this plan will be returned to USGS upon completion of revisions required by the permanent OSM regulatory program, the natural presumption is that any adverse impacts which have been presently identified by USGS via the Environmental Impact Statement review process will be less after compliance with 30 CFR 700.

Special stipulations such as utilization of buses to transport employees to and from work (page VIII-6) may better be handled by voluntary efforts of personnel who have been encouraged to form car pools to minimize traffic on State Highway 59. Also, The Carter Mining Company has voluntarily staggered Caballo work shifts to minimize traffic congestion at peak use times.

Page VIII-7--Alternative H appears to go beyond the purposes for USGS approval under the regulations implementing the mineral leasing laws, i.e., review of mining plans to assure full recovery of the coal resource and review of reclamation plans to assure protection of the environment. Alternative H seeks to resolve a coal leasing problem which the government has recognized, but

44 Your concerns are noted. The alternatives (chapter VIII) have been extensively revised.

The efforts of the applicant to mitigate traffic congestion are acknowledged.

which it does not have authority to handle at this time. Not only is it wholly conjectural at this point as to whether the open tracts could be mined later as an independent operation; it is wholly conjectural as to whether this coal will ever be leased. Alternative H is making the assumption that the coal will at some time be leased and that it will be obtained by The Carter Mining Company or that an agreement could be worked out between Carter and the lessee to develop the presently unleased coal. This is wholly conjectural on the part of the USGS and as such, should not be classified as a viable alternative. Also, this alternative goes counter to the basic USGS policy of diligent development in that Alternative H is based on the concept that presently leased coal will not be developed until such time in the future as it is determined whether additional coal should be leased.

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Director
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11/30/78

Dear Sir::

I have just reviewed the Draft Environmental Statement for the Caballo Mine in Campbell County, Wyoming and have determined that it is one of the worst I have read to date, exclusive of REA attempts.

Certainly the most bothersome thing about this statement is that the facility has already been built, and production has begun. What good is an impact statement when the anticipated project is completed before publication?

1 Further, the statement does not even recognize the fact that most all of the facilities have been constructed on the Caballo site, and that coal was officially shipped on the 10th of October, 1978. 75 employees are presently working at the Caballo mine.

May I suggest that in the writing of the final statement the future tense phrases such as "will be," be changed to past tense ones such as "has been."

Other patent deficiencies include:

1) No attempt by USGS to determine what Carter Oil/Exxon might be planning for a little less than half of their leasehold, straining their investigative powers to find, "presumably additional mining will be proposed." (p. I-2)

2 2) No mention of the 100 or so million tons of reserves on state and private land which will be mined, presumably, along with the 500 stated.

3 3) Totally inadequate disclosure of the impacts associated with a 24 million ton per year mine as presented on p. I-7.

4 4) Reference to climatological equipment maintained on-site, but no data from such presented, except two hivol maximums.

5 5) No indication as to the amount of alluvium, or alluvial valley floors as defined by SMCRA, 1977.

Responding to: Reed Zars
Powder River Basin Resource Council
810 Richards
Gillette, Wyoming 82716

1 The Caballo mine facilities have been constructed on land covered by Wyoming State permit No. 433. Mining under this lease is proceeding on private fee coal. The Federal Governmment had no involvement with that land and coal until passage of SMCRA, after the State permit had been issued. The requirements in NEPA for an environmental impact statement apply to actions on Federal land and coal. The fact that the mine is in operation should have no effect on the impacts due to mining and reclamation under the Federal leases as discussed in the DES.

2 The text has been changed.

3 The current mining plan calls for a maximum annual production of 12 million tons, as described in the DES. The facilities are designed so that production could be increased to 24 million tons if demand should warrant, but there are no plans to do so at this time. An increase in production of this magnitude would constitute a major change in the mining plan and would require approval by OSM and State authorities. An environmental review of the impacts of this increased production would be required before approval could be granted.

4 The values given are used in table II-10, for comparison with similar readings from other monitors in the area. Complete data from the onsite air quality monitors is on file with Wyoming DEQ.

5 Such determinations have not yet been made by the regulatory authorities under SMCRA.

5 6) No indication as to the possibility of Prime Farmlands, as defined by SMRCA, 1977.

7) Air quality data and determinations:

a) First the statement says, "Generally, air quality over the leasehold does not exceed ari quality standards." Then table II-10 shows violations of both annual geometric mean and 24 hour standards on nearby mines.

b) The statement does not recognize the fact that air quality standards are <u>not</u> to be violated, <u>anytime</u>.

c) The statement does not assess the impact of this facility on other mines and operations in the area insofar as TSP and other emissions are concerned.

6 d) The statement does not bother to determine independently whether or not the air quality information corresponds with state-of-the-art projections.

e) Applicant maintains, without any documentation, that the total emissions for the Caballo Mine will be 1,344 tons per year at 12 mtpy. This amounts to 75 tons per mtpy, a figure some 800 percent below the lowest PEDCO projections. (PEDCO, Survey of Fugitive Dust from Coal Mines, Feb., 1978, EPA Region VIII).

f) The logic, or rather lack thereof, on page III-5 is an insult. How can the Belle Ayr mine be used as an exemplar in reference to air quality when it is presently in massive violation? And why should the statement "the Caballo Mine should degrade air quality only slightly off the leasehold" trouble anyone?

8) Water quality determinations:

7 a) How much water is the facility to consume. This is an impact...

8 b) What provissions might be necessary to protect local water users, and other mines in the area?

9 c) How much water is needed for dust control?

10 d) From 25-30 percent of coal is water. What does the shipment of this water to the Midwest mean to Wyoming? (182-217 acre-feet per million tons of coal.

11 e) Where is any of the data to back up the conclusion, however ill-put, that "Impacts on water resources will ultimately be of moderate significance because they will have little effect on anticipated water uses, except stock watering?"

6 The section on air quality has been revised in response to comment 3 by EPA.

7 At peak consumption, the facility is expected to use 231,000 gallons per day (p. I-6). The portion of the water used for dust control (approximately 87 percent) will come mainly from dewatering of the mine and will return to the local hydrologic regime as it is used on the roads.

8 As discussed on pages III-3 and III-4, it is not anticipated that the ground water will be affected more than a few miles from the site. Because a relatively small amount of water is involved, and the aquifer is fine grained, water levels probably will not be lowered more than 3 to 5 feet beyond a mile from the site. This normally will not affect the availability of ground water for stock and domestic use, the only other uses in the area. Section 715.17 of SMCRA requires the permittee to replace the water supply of any owner whose supply has been affected by the coal mine operations.

9 It is estimated that at maximum production, during the summer, about 200,000 gallons of water per day will be needed for dust control (p. I-6); less will be needed during the rest of the year.

10 The water that occurs in coal (29 to 32 percent as shown in the proximate and ultimate analyses on page II-7) is water that is locked in the structure of the coal and is <u>not</u> available for use. It cannot be pumped out nor does it provide flow to springs and streams.

11 This conclusion, reached by professional hydrologists of both the USGS and private consultants, is based on consideration of the amount of water to be used by the mine and the hydrologic system at the mine, that being used for premining purposes, and that anticipated as being used for postmining land uses.

Sooner or later USGS is going to have to recognize that each mine in the Powder River Basin has a significant impact on the people, land, air, and water. Just because the impact is only a small percentage of the total development, there is no reason to excuse it because of the size of the increment.

As I said before, this impact statement is very poor, and borders on the worthless. Through NEPA, 1969, all significant Federal actions must be accompanied by an impact statement. This statement is to be detailed and thorough. It is the responsibility of the USGS to bring the Caballo Mine impact statement at least to the level of adequacy, if not beyond.

Thank you for your time and consideration,

Reed Zars

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CHAPTER X

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CHAPTER XI

APPENDIX A

CORRESPONDENCE FROM THE STATE HISTORIC PRESERVATION OFFICER

THE STATE OF WYOMING

ED HERSCHLER
GOVERNOR

Wyoming Recreation Commission

604 EAST 25TH STREET CHEYENNE, WYOMING 82002

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Thayne 83127
ALBERT PILCH
1800 Morse Lee
Evanston 82930

JAN L. WILSON
Director
777-7695

October 23, 1978

Director, U.S. Geological Survey
National Center, Mail Stop 108
Reston, Virginia 22092

Dear Sir:

On October 12 we received the draft environmental statement, "Proposed Mining and Reclamation Plan, Caballo Mine, Campbell County, Wyoming," with cover letter attached. We have reviewed the statement with particular regard for content regarding cultural resources.

According to the paragraphs on pages II-26 and 27, the Wyoming State Historic Preservation Officer has been consulted and none of the cultural resources identified on the leasehold are listed on, or eligible for, the National Register of Historic Places. Since historic and archeological surveys necessary for project clearance have been accomplished, and since no new developments have taken place to indicate that certain other cultural values have been found, the State Historic Preservation Officer (SHPO) recommends that clearance of the project be approved relative to cultural values.

However, it is recommended that the letter of Ned Frost to Mr. Nyles Humphrey of the Bureau of Land Management, date July 14, 1976, be included in the final ES just for the record. A copy of Mr. Frost's letter is enclosed.

Although cultural clearance of the project is recommended by the SHPO, please keep in mind that cultural materials are occasionally found during the course of project work. If any are found work must halted and the Office of the Wyoming State Archeologist must be contacted immediately. At that time arrangements for investigation and/or salvage of the materials can be made.

Director, U.S. Geological Survey
Reston, Virginia 22092

October 23, 1978

Thank you for allowing us to comment upon the Caballo Mine draft EIS, and for your concern for Wyoming's cultural resources.

Sincerely,

Jan L. Wilson, Director &
State Historic Preservation Officer

BY:

Mark Junge, Acting Chief
Historic Division

JLW:MGJ:klm
Encl.

July 14, 1976

Mr. Myles L. Humphrey
Wyoming State Office
Bureau of Land Management
P. O. Box 1828
Cheyenne, Wyoming 82001

Dear Mr. Humphrey:

I have a letter from you dated May 21, 1976 (your file reference 6230) concerning an environmental impact statement being prepared by your Casper District Office for the Carter Mining Company's proposed Caballo Mine. At the time your letter was received I had an unusually tall stack of environmental impact statements and similar correspondence to review and comment upon, somehow I have missed drawing your letter from among all the others until now it is very late to reply. I am embarrassed and do apologize most sincerely.

Attached to your letter was a copy of the report on the archeological survey conducted by personnel of the State Archeologist over the terrain subject to the Caballo Mining proposal. Since the State Archeologist is a member of the Recreation Commission's staff, that report is a responsibility of this office. I regret that the wording regarding recommendation of clearance to proceed with the mining venture, insofar as archeological values of the cultural environment were concerned, has caused misunderstanding. However it appears to me that the Carter Company's failure to understand was at least as much due to their misreading as it was to the archeologist's miswriting. The statement that "Archeological clearance can now be granted" does not imply to me that it is given; it implys to me that those with authority to do so can now say "Archeological clearance is hereby given". However, I agree with you that the statement is ambiguous and could be interpreted as any certain individual would like to interpret it. Certainly both the historians and the archeologists on the State Historic Preservation Officer's staff are aware that, insofar as actions of the Federal government are concerned, we serve in an advisory role only--we comment, we do not administer. Personally, I always try to phrase my comments along the lines that you will find at the end of this letter.

I have noted your statement that there are two abandoned homesteads, circa 1920, located within the area which "are not felt to be eligible for nomination to the National Register." There are abandoned homesteads, many of them--especially relating to the 1920 decade, in every section of Wyoming. Our preservation philosophy regarding them is that only exceptional examples, wherein the means to provide effective preservation, stabilization or restoration is available, should be nominated for enrollment in the National Register. In this instance we will accept the findings of your Casper District's historic research that these two examples are not eligible for enrollment.

There are no other historic places within the mining area, none that are enrolled in the National Register of Historic Places and none that are considered eligible for enrollment by the Wyoming State Historic Preservation Officer. And, so far as we are aware, there are none undergoing nomination for enrollment by any agency of Federal, State or Local governments.

As far as prehistoric cultural sites are concerned, the report by our archeologists mentions one, 48CA22, which might, after further testing, be found eligible for National Register listing. But that site is more than a mile outside the boundaries of the proposed mining area. Actual mining activities will not affect it. The report by the archeologists does stipulate--shall I say that in commenting that archeological clearance to proceed with mining operations can be given by the proper authority the stipulation is made--that:

1. The mitigating measures recommended for the known sites be provided prior to disturbance of the terrain in those areas.

2. If any unknown sites or archeological materials become apparent during any phase of the mining project, the State Archeologist must be notified at once.

In consideration of the objectives formulated in the Wyoming State Historic Preservation Plan and of factors discussed in foregoing passages of this letter the State Historic Preservation Officer comments: The proposed Caballo Mining Operation will not adversely affect the cultural environment, it will not affect any property enrolled in the National Register of Historic Places nor will it affect any property deemed eligible

Mr. Myles L. Humphrey
July 14, 1976
Page 3

for such enrollment. As far as protection of the cultural environment is concerned, there is no reason why the proper authority should not issue clearance to proceed with development of the mine.

Sincerely,

Paul H. Westedt, Director and
Wyoming State
Historic Preservation Officer

by Ned Frost, Chief
Historical Division

PHW/NMF/mlr

cc: Dr. George Frison
Mr. George Reimens

bcc: RF:

7/14/76 NF

GOVERNMENT PRINTING OFFICE: 1979--677-026/60

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Form 1279–3
(June 1984)

BORROWER'S CARD

TD 195 .C58 C32 1979

Proposed mining and reclamation plan

DATE LOANED	BORROWER	

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CABALLO MINE
MINING AND RECLAMATION PLAN
CAMPBELL COUNTY, WYOMING
MAP 2

437,500 440,000 442,500 445,000 447,500 450,000 452,500 455,000 457,500 460,000 462,500 465,000

R.71W. R.70W.

1273,500N 1271,000N 1268,500N 1266,000N 1263,500N 1261,000N 1258,500N 1256,000N 1253,500N

T.48N.

Caballo Mine 69 KV Power Line Abandoned 2000

Existing Tri-County 69KV Transmission Line

Relocated Tri-County 69 KV Line Phase 2 (1984) (Wyoming Tri-County Line and Power Dist Line)

PIT A OUTSIDE SPOIL
(CONTINUOUS CONSTRUCTION
FROM 1968-2000)

RECLAIMED END 1999

PIT A HIGHWALL CREST LINE

PIT A

PIT B

PIT C

PIT B OUTSIDE SPOIL
(CONTINUOUS CONSTRUCTION
FROM 1980-2006)

PIT C OUTSIDE SPOIL
(CONTINUOUS CONSTRUCTION
FROM 1993-2021)

PIT B HIGHWALL CREST LINE

PIT C HIGHWALL CREST LINE

69 KV Tender Phase 2 (1984)

Caballo Mine 69 KV Power Line (2000)

Amax Relocation of Tri-County

State of Wyoming 0-26937-A

Federal W 3397

Federal W-3397

Federal W-49644

Open Federal

Open Federal

Peabody W-32063(PR)

Peabody (Preference Right)

Clark

Cayce

Cassidy

Chambers

PIT C BOXCUT SPOIL B(1983)

PIT C BOXCUT SPOIL A (1984)

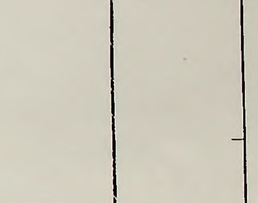
SCORIA PIT AREA

PIT A SPOIL AREA 1978-1979

DRAGLINE SPOIL - 2000 B.C.

Sedimentation Pond

Mined out in 2000



N

Lease boundaries
Limit of leasehold
Wyoming State permit boundary no. 433
Area proposed to be mined

SCALE 1:12000

½ 0 1 MILE

.5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

Modified from the Carter Mining Company, 1978

MAP OF THE PROPOSED CABALLO MINE SHOWING SEQUENCE OF MINING IN THE THREE PITS

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CABALLO MINE
MINING AND RECLAMATION PLAN
CAMPBELL COUNTY, WYOMING
MAP 3

R 71 W R 70 W

LEGEND

TEXTURE

1—Tight Clay
3—Clay Loams
6—Sandy Loams
61—Sandy Clay Loams
7—Loams
8—Loamy Sand

DEPTH

A—60+ Inches
B—40-60 Inches
C—20-40 Inches
D— 6-20 Inches

MISCELLANEOUS

P—Porcelanite
PS—Porcelanite-Sandstone Complex
R—Red Phase of Sandy Clay Loams
RB—Rough Breaks
S—Saline solution
SS—Sandstone
W—Wet
H—Homestead
U—Unsuitable for topsoil material*
Res—Reservoir
S—Sample site

*Based on Wyo. Dept. of Environmental Quality-Land Quality Division Guideline 2

N

1,373,300 N
1,371,000 N
1,368,500 N
1,366,000 N
1,363,500 N
1,361,000 N
1,358,500 N
1,356,000 N

T 48 N

437,300 E
440,000 E
442,500 E
445,000 E
447,500 E
450,000 E
452,500 E
455,000 E
457,500 E
460,000 E
462,500 E
465,000 E

R 71 W R 70 W

0 ½ 1 MILE

Modified from the Carter Mining Company, 1977

MAP SHOWING THE SOILS FOUND IN THE VICINITY OF THE PROPOSED CABALLO MINE

*U.S. GOVERNMENT PRINTING OFFICE: 1979-677-026/60

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CABALLO MINE
MINING AND RECLAMATION PLAN
CAMPBELL COUNTY, WYOMING
MAP 4

EXPLANATION

Plant Community
- Big Sagebrush
- Silver Sagebrush
- Upland Grassland
- Scoria Grassland
- Playa Grassland
- Meadow
- Grainlands
- Haylands
- Pasturelands
- Fallow

Other Areas and Trees
- Developed Areas
- Disturbed Areas
- Windbreak Trees
- Native Trees- * Refer to tables for descriptive data
- Permit boundary
- Study area boundary
- Comparison areas

Sample Locations
- Cover
- Productivity
- Hayfields

Note: Cover and productivity sample location numbers for each community begins with the Arabic number 1.

LEGEND
- LEASE BOUNDARY
- PERMIT BOUNDARY AS APPLIED FOR

AUTHORIZED BY DEQ LAND QUALITY DIVISION, SHERIDAN WYOMING

THE CARTER MINING COMPANY
CABALLO MINE
15 MI SO GILLETTE WYO.

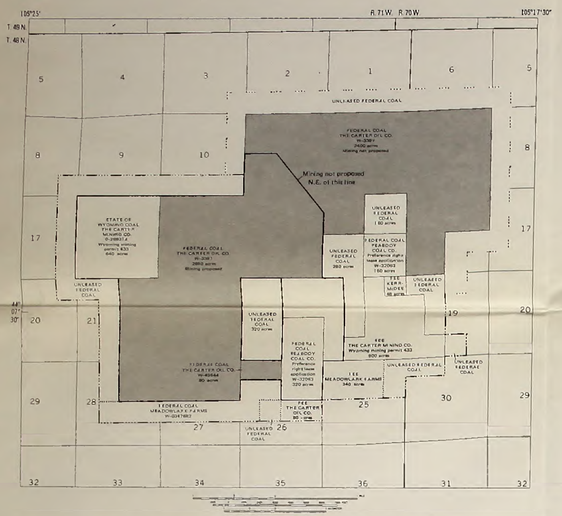
FEET
500 0 500 1000 1500
CONTOUR INTERVAL 20 FEET

CA-500-EN-78-WY-459

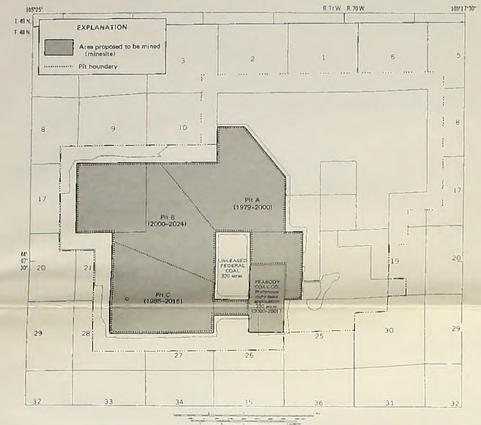
MAP SHOWING THE VEGETATION TYPES FOUND IN THE VICINITY OF THE PROPOSED CABALLO MINE

Denver Service Center

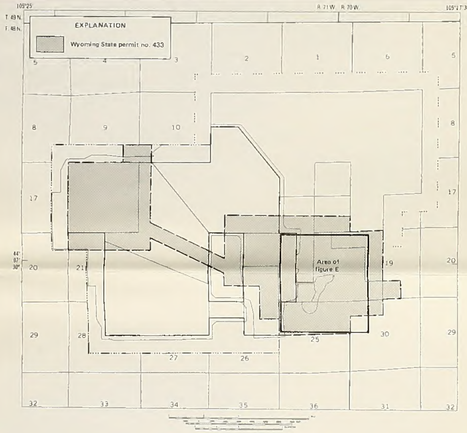
CABALLO MINE
MINING AND RECLAMATION PLAN
CAMPBELL COUNTY, WYOMING
MAP 1



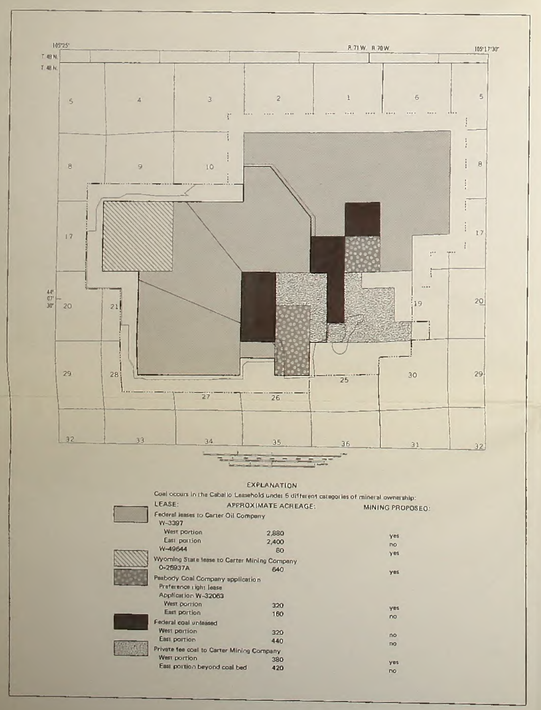
A. LEASE STATUS



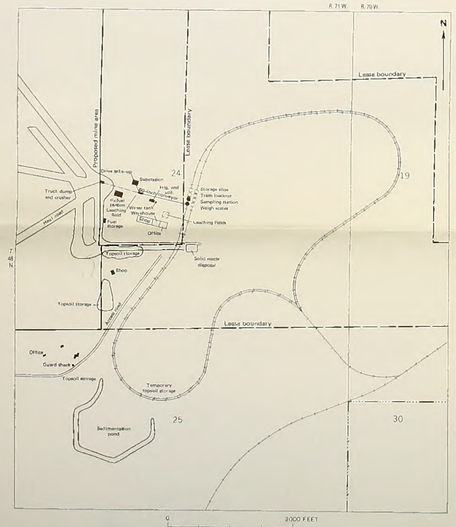
C. MINE PIT BOUNDARIES



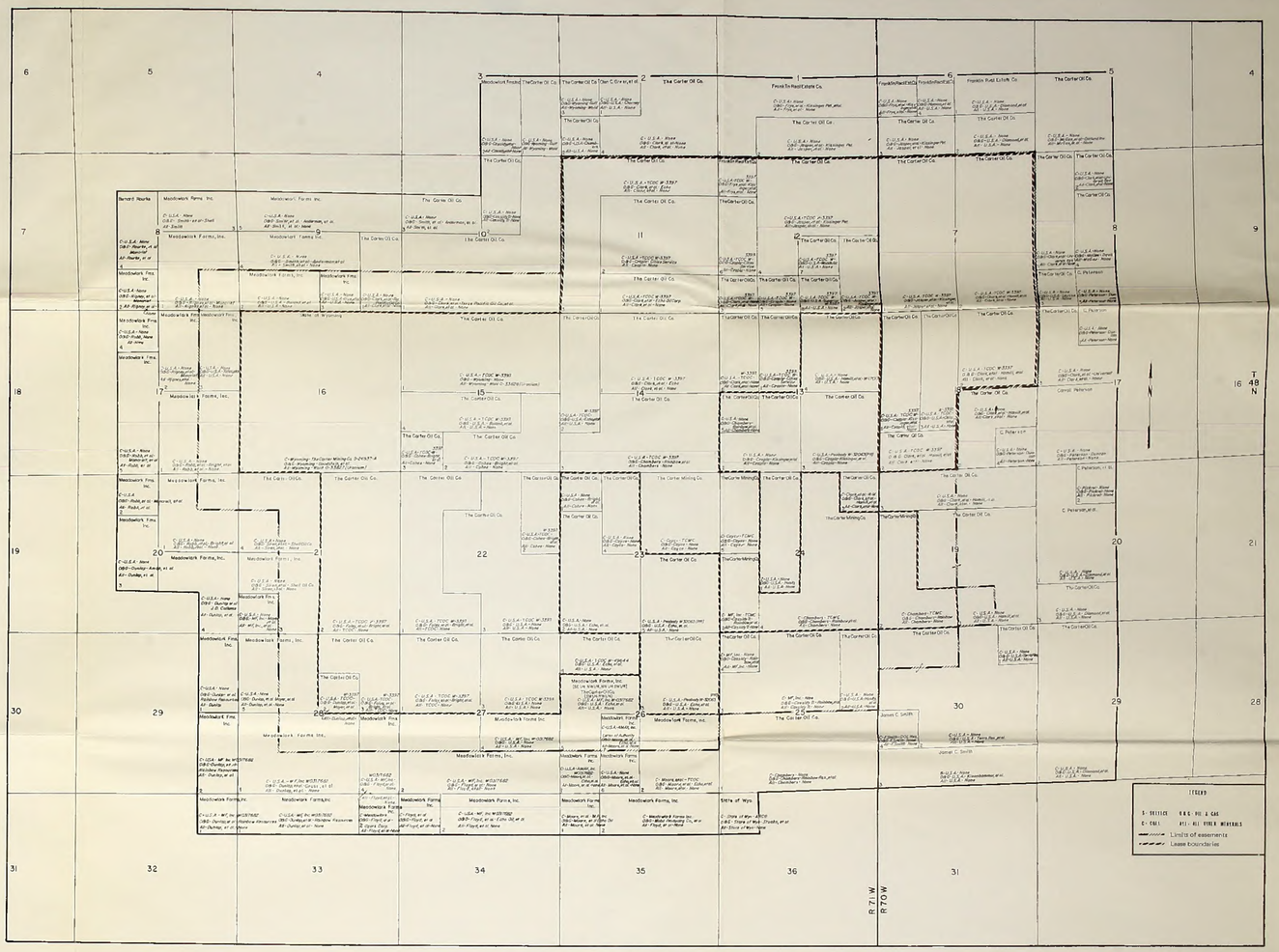
D. WYOMING STATE PERMIT



B. COAL ESTATE



E. MINE PLANTSITE


R.71W.
R.70W.
T. 49 N.
T. 48 N.
Bernard Rourke
Meadowork Farms, Inc.
The Carter Oil Co.
Meadowlark Farms, Inc.
Meadowlark Farms, Inc.
Meadowlark Farms, Inc